



*Falsely Positive*

*Includes CAS Evidence*

*2nd Edition*

# The Wiki Defense

How the French Lab (LNDD), US Anti-Doping Agency, and AAA Arbitrators Failed

**Floyd Landis Doping Test 995474:  
The Science Summarized**

**By Arnie Baker, MD**

# Table of Contents<sup>1</sup>

Acknowledgments	6
Source Documents/References	6
About the Author	6
How I Became Involved	7
Publication Notices	10
Forward: Why the Wiki Defense?	12
What's What / Who's Who	14
<b>Part 1: The Issues</b>	<b>15</b>
<b>Burden of Proof</b>	<b>16</b>
<b>Top Issues</b>	<b>18</b>
They Lied	18
They Botched the Test in the First Place	18
They Never Even Identified Testosterone Properly	18
<b>Negative Test</b>	<b>19</b>
<b>***1. Lies and Fraud</b>	<b>21</b>
<b>***1.1 Vanishing Acts</b>	<b>25</b>
1A. Electronic Data Records Destruction	25
1B. Overwriting of Files	27
1C. Document Doctoring	28
1D. Document Omission	30
<b>***1.2 Magical Appearances</b>	<b>31</b>
1E. August 2006 Linearity Testing	32
1F. GC/MS Instrument Column Maintenance Log	38
1G: Methyltestosterone Reference Solution Log	42
1H: Fraudulent Witness Declaration	45
1I: USADA-Expert Told "Facts" Not in Evidence	49

<b>***1.3 Misdirection/Lies</b>	<b>50</b>
1J. USADA Denies Need for Chain of Custody Location Evidence Shows Need/Lab <i>Fails</i> to Document Location	51
1K. USADA States Chain of Custody Documents Intact Evidence Shows Contradictions	52
1L. USADA Denies Need for Validation Studies Evidence Shows Otherwise	53
1M. USADA States Results Positive at All Labs Test Results Would Not Be Positive at UCLA	55
1M. USADA States Results Positive at All Labs Test Results Would Not Be Positive at UCLA	55
1N. USADA States All Controls Were Accurate Evidence Shows Otherwise	57
1O. USADA/Lab Denies Manual Corrections or SOP Evidence Shows Manual Methods Routine/SOP	58
1P. USADA/Lab <i>Denies</i> Need to Consider Uncertainty Evidence Shows Requirement	60
1Q. USADA <i>Denies</i> Time Gaps Evidence Shows Multiple Time Gaps	61
1R. USADA <i>Denies</i> Illegitimate Deletion of Data Evidence Shows Undocumented Deletion of Data	63
1S. USADA/Lab States Operating Pressure Okay Green Light Fraud	64
1T. USADA States Accreditation a New CAS Issue Accreditation Raised at AAA Hearing	65
1U. USADA States Identification Method in IRMS Method Fails → USADA Changes Story	66
1V. USADA States IRMS Columns Different SOP Violation → USADA Changes Story	68
1W. USADA Denies Bad Chromatography Admits Co-Elution of Peaks <i>Were</i> a Problem	71
1X. USADA Expert: Internal Standard as Quality Control Failure → USADA Experts Change Testimony	72

<sup>1</sup> Throughout this book, arguments are rated one to three stars.

\*\*\* Arguments are the strongest, and may be case dispositive.

\*\* Arguments are strong.

\* Important, but weaker arguments.

## 2. It Does Not Make Sense 75

2A. Testosterone Level Normal, <i>Not</i> High	75
2B. Results Were Normal Before and After	76
2C. Urine is Concentrated	76
2D. Testosterone Does Not Work In One Day	77
2E. Was Something Fishy Going On?	78
2F. Lab is Error-Prone	79
2G. Presumption of Guilt Wrong Approach	79
2H. Power Within Range	80

## 3. Lab Accuracy: General 81

*** 3A. Lab Errors, General	82
*** 3B. Laboratory Standards	83
*** 3C. The Lab Puts <i>Garbage In</i> , It Gets <i>Garbage Out</i>	84
*** 3D. Electronic Data Files Defective	85
*** 3E. Trivial Tests Do <i>Not</i> Guarantee Accuracy	86
*** 3F. Accreditation Testing Does <i>Not</i> Guarantee Ability	86
*** 3G. Lab <i>Not</i> Accredited For <i>Accurate</i> IRMS Test	87
* 3H. Proficiency Testing Does <i>Not</i> Guarantee Ability	91
* 3I. Inadequate Documentation	91
* 3J. Operators Have Minimum Education/Experience	92

## 4. Lab Accuracy: Procedure 93

*** 4A. Chain of Custody	93
*** 4B. Timeline with Chain of Custody and Other Notes	99
*** 4C. Document Package Riddled with Errors	109
*** 4D. Wrong Sample Numbers, Cross-Outs	113
*** 4E. Obsolete Hardware and Software	118
*** 4F. Reprocessing Samples	122
*** 4G. Unexplained Time Gaps	123
*** 4H. Batch Results Don't Match Individual Reports	126
** 4I. Lack of Controls	127
** 4J. Variation in Negative Control Values	131
** 4K. Lack of Replicates	132
** 4L. Contamination/Degradation	134
** 4M. Procedures Wrongly Verified	140

** 4N. Reference Solution Errors	141
** 4O. Lab Knew it Was Landis	143
* 4P. Same Operator	145
* 4Q. Inadequate Lab Security	149

## 5. GC/MS: Testosterone/Epitestosterone Ratio 150

T/E Testing Summary Results	151
*** 5A. Bad Identification: Single Ion	152
*** 5B. Bad Identification: Matrix Interference	155
*** 5C. Bad Identification: T/E Peaks Misidentified	159
*** 5D. Bad Identification: Deuterated Androsterone	160
** 5E. No Controls in Run	162
** 5F. T and E Values Vary ('A' Sample)	163
** 5G. T/E Ratios <i>Not</i> Accurate ('A' Sample)	164
* 5H. T/E, T, and E Uncertainty	165
* 5I. Poor Linearity	166
* 5J. Lab Cannot Quantify Reference Steroids	167
* 5K. Confirmation <i>Not</i> in Triplicate ('A' Sample)	169
* 5L. Testosterone Level <i>Not</i> High ('B' Sample)	170
* 5M. Longitudinal Testing	171

## 6. IRMS: Carbon Isotope Test 176

*** Compound Specific Isotope Analysis Requirements	178
Does LNDD Have Identification Criteria?	180
Identification Failure	183
*** 6A. Bad Identification: Lack of Machine Coupling	184
*** 6B. Bad ID: Retention Time Shift: 995474	185
*** 6C. Bad ID: Retention Time Shift: Retesting	186
*** 6D. Bad Identification: Different Method Files	187
*** 6E. Bad Identification: Wrong Column Used	188
*** 6F. Bad Identification: Bad Chromatography	197
*** 6G. Bad Identification: Internal Standard Failure	201
*** 6H. Bad Identification: Results Not Reproducible	206
*** 6I. Only One Metabolite Abnormal	211
*** 6J. LNDD Has No Reference Range Population	216
*** 6K. No Positive Controls in Run	222

***	6L. Negative Control Positive	223
**	6M. LNDD Has No IRMS Operating Manual	224
**	6N. Pressures	225
**	6O. Poor Linearity	228
**	6P. Measurement Error: Internal Standard	231
**	6Q. Measurement Error: Erroneous Conclusion	233
*	6R. All Metabolites Within LNDD Negative Range	236
*	6S. Metabolites Dependent	236
*	6T. Absolute Androstanediol Values Negative	237
*	6U. No Replicates	237
*	6V. Mass Balance Formula Wrong	238
<b>7. Retesting Tour Samples</b>		<b>239</b>
***	7A. ‘A’ Samples Negative → ‘B’ Samples Negative	239
***	7B. Observers Denied Access	240
***	7C. Smell Test	240
***	7D (1-6). Why IRMS at LNDD is Inaccurate	242
***	7E. Bad Chromatography Characterizes Retesting	245
***	7F. Time Gaps	249
***	7G. Deleted Log Files	255
***	7H. Inability to Accurately Determine SI	259
***	7I. QC Negative Fails Accuracy Testing	260
*	7J. Landis’s Samples Different Than “Controls”	262
<b>8. Due Process Issues</b>		<b>263</b>
	8A. The WADA System	263
	8B. Early Release of Sample Results	264
	8C. Media Comments By WADA And Other Officials	265
	8D. Hiding and Moving the Ball	266
	8E. Lies and Fraud	266
	8F. Report Documentation	266
	8G. Provision of Document Package	267
	8H. Timing	267
	8I. ADRB Dismissal Timing	267
	8J. Scientific Misconduct. LNDD Errors	267
	8K. Release of Other Athletes’ Results	268

<b>Appendix A: ***ISL and Other Violations</b>	<b>269</b>
<b>Appendix B: ***Metabolite Positivity</b>	<b>281</b>
<b>Appendix C: ***Statistical Arguments</b>	<b>287</b>
<b>Appendix D: ***Whistleblower Documents</b>	<b>299</b>
<b>Appendix E: Error List</b>	<b>304</b>
<b>Appendix F: Longitudinal Data</b>	<b>307</b>
<b>Appendix G: Test Procedures and Problems</b>	<b>313</b>
<b>Appendix H: Testing Terms</b>	<b>329</b>
<b>Appendix I: Discovery Docs</b>	<b>335</b>
<b>Appendix J: Doc Pac Table of Contents</b>	<b>341</b>
<b>Appendix K: References</b>	<b>343</b>

## **Part 2: Arbitrators, Attorneys, and Witnesses 351**

<b>The AAA Arbitrators</b>	<b>352</b>
Patrice M. Brunet	352
Christopher L. Campbell	352
Richard H. McLaren	352
<b>AAA Panel Expert</b>	<b>353</b>
Francesco Botrè	353
<b>The AAA Arbitrators Fail</b>	<b>354</b>

<b>The CAS Arbitrators</b>	<b>355</b>
David Williams	355
Jan Paulsson	355
David Rivkin	355

<b>Landis’s Attorneys</b>	<b>356</b>
Maurice Suh (AAA and CAS)	356
Howard Jacobs (AAA)	356
Daniel Weiss (AAA and CAS)	356
Paul Scott (AAA and CAS)	356



<b>Landis's Testifying Witnesses</b>	<b>357</b>	<b>Jumeau, Janine</b>	<b>392</b>
<b>Amory, John, MD</b>	<b>357</b>	IRMS Technical Writer	392
Andrologist	357	<b>LeMond, Greg</b>	<b>393</b>
<b>Davis, Simon, PhD</b>	<b>358</b>	Three-Time Tour de France Champion	393
IRMS Instrumentation Expert	358	<b>Le Petit, Gérard</b>	<b>394</b>
<b>Goldberger, Bruce, PhD</b>	<b>362</b>	Machine Maintenance Service Agent	394
GC/MS Expert	362	<b>Martin, Laurent</b>	<b>395</b>
<b>Goodman, Keith, PhD</b>	<b>364</b>	Analytical Chemist	395
IRMS Expert	364	<b>Mathews, Dwight E., PhD</b>	<b>396</b>
<b>Landis, Floyd</b>	<b>365</b>	IRMS Expert	396
Respondent	365	<b>Mongongu, Cynthia</b>	<b>400</b>
<b>Meier-Augenstein, Wolfram, PhD</b>	<b>368</b>	Analytical Chemist	400
IRMS Expert	368	<b>Papp, Joe</b>	<b>404</b>
		Admitted Doper and Drug Trafficker	404
<b>USADA Attorneys</b>	<b>371</b>	<b>Schänzer, Wilhelm, PhD</b>	<b>406</b>
Richard R. Young	371	German Anti-Doping Laboratory Director	406
Matthew S. Barnett	371	<b>Shackleton, Cedric</b>	<b>407</b>
Daniel J. Dunn	371	Steroid Metabolism Expert	407
Jennifer Sloan	371		
		<b>Part 3: Selected Press and Blog Coverage</b>	<b>408</b>
<b>USADA Testifying Witnesses</b>	<b>372</b>		
<b>Ayotte, Christiane, Dr.</b>	<b>372</b>	<b>Final Words: Improving Fairness</b>	<b>438</b>
Canadian Anti-Doping Laboratory Director	372		
<b>Brenna, Tom, Dr.</b>	<b>376</b>		
IRMS Expert	376		
<b>Buisson, Corrine, Dr.</b>	<b>382</b>		
IRMS Supervisor	382		
<b>Catlin, Don H., Dr.</b>	<b>383</b>		
Former USA Anti-Doping Laboratory Director	383		
<b>Frelat, Claire</b>	<b>388</b>		
Analytical Chemist	388		
<b>Garcia, Myriam</b>	<b>391</b>		
Analytical Chemist	391		

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## Source Documents/References

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The full laboratory report. The complete transcripts of the arbitrations. The legal briefs.

Most of the primary source documents used for this book are linked at <http://arniebakercycling.com/books/wiki.htm>.

## About the Author

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Dr. Arnie Baker has been coaching since 1987. A professional, licensed USCF coach, he has coached racers to several Olympic Games, more than 120 U.S. National Championships, and 30 U.S. records. He is the National Cycling Coach for Team in Training. This endurance-training program of more than 800 coaches and 30,000 participants raises more than \$80,000,000 each year for the Leukemia & Lymphoma Society.



Dr. Baker is a licensed physician in San Diego, California. He obtained his M.D. as well as a master's degree in surgery from McGill University, Montreal. He is a board-certified family practitioner. Before retiring to ride, coach, and write, he devoted approximately half of his medical practice to bicyclists, specializing in bicycling medicine.

He has served on the fitness board of *Bicycling* magazine as a bicycling-physician consultant. He has been a medical consultant to *USA Cycling* and the *International Olympic Committee*.

Arnie has authored or co-authored 17 books and more than 1,000 articles on bicycling and bicycling-related subjects.

# How I Became Involved

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Arnie behind Landis at a Los Angeles press conference, May 10, 2007.

I met and started coaching Landis over a decade ago.

Landis was a mountain biker when he started with me, and a good one at that. He had already won the Junior National Cross-Country championships.

Landis was obviously talented and willing to work very hard. At the time, I was also coaching Tinker Juarez, multiple mountain biking National Champion and Olympic Team member.

Up a 9-mile dirt climb, Tinker was about 2 minutes faster than Landis was. However, off-dirt, it was the other way around—Landis was ahead by several minutes.

The difference was remarkable. Landis had a bigger engine—however, Tinker was smoother on the dirt and was able to use what he had to better advantage.

I knew Landis could obtain even better results on the road. At the age of 20, I had already timed Landis up Mt. Palomar, in Southern California, several minutes faster than Vuelta a España and Giro d'Italia winner and Hour-Record holder Tony Rominger.

When sponsorship in mountain biking dried up, Landis switched to road.

Landis began his road career with a district rep-approved instant upgrade to Cat 3. His first road race, he flatted. Carrying a spare tube and pump, mountain-biker style, he stopped, fixed his tire, was passed by the entire field, caught up, and went on to win the race by five minutes.

In his next road race, I started in the Cat 1,2s. Landis, again as a Cat 3, starting 15 minutes behind, passed my entire field, inside, on the dirt, in our first 12-mile lap, and went on to win his race by more than 30 minutes.

With an upgrade to Cat 2, he raced a Pro-Am race full of *Mercury* riders. Solo, he tore the field apart, and John Wordin, *Mercury* racing team manager, signed him.

The Postal years, a broken hip, Phonak.

Those years flew by.

During the 2006 Tour, like many others, I was glued to the television watching Stage 17—for me the most fabulous day in cycling.

At the Tour's end, amid doping allegations, I did not speak to the press—though my phone rang nonstop for three days, and more than 30 media outlets contacted me.

Like Landis, I really had nothing to say—I did not know what the situation was. Unlike, Landis, I could keep to myself.

David Witt, Landis's father-in-law, died in late August, 2006. I had introduced Landis to David, and I had performed the wedding ceremony for Rose (the mother of Floyd's wife Amber) and David some years before.

After I said a few words at David's memorial service, I saw Landis, and offered to look at his laboratory document package when he received it.

I had had *no* background in reviewing doping document packages. I had no background in anti-doping testing.

I *did* have a decade of experience in looking at medical records, auditing charts for quality control—for my medical group, for my hospital, and for the State of California.

When I received Landis's document package, I was appalled at the lack of quality. Sample numbers were mixed up. Sample numbers were *overwritten*. Results made no sense, and at times were mutually exclusive.

Fairly quickly, I told Landis that if the standards for anti-doping laboratories were anything like the standards for medical laboratories and medical record keeping, this was not a positive test. This was a test that should be thrown out.

Landis decided early to have an open arbitration. Athletes have the right to request an open hearing, but it had never been done before. Landis already knew that the World Anti-Doping Agency (WADA) system was a closed one, without standard checks and balances, where the writers of the rules could also be the prosecutors and the arbitrators.

Moreover, hardly anyone knew about anti-doping testing, and those who did generally worked in anti-doping laboratories and were prohibited from assisting athletes.

Early on, we decided on an approach not favored by most attorneys: We would post everything we could about the case on the internet. We would call it the *Wiki Defense*.

We would show what we had, and figured we might obtain some help from interested readers.

Here is one analogy of the WADA system:

Imagine you are driving your car on the freeway, and a traffic officer pulls you over.

Officer: "I'm going to write you a ticket."

Driver: "How fast was I going?"

Officer: "I'm not going to tell you."

Driver: "What's the speed limit?"

Officer: "I'm not going to tell you."

Driver: "Can I go to court and fight this?"

Officer: "Yes, but you can only choose from judges that I've preselected. After you're found guilty, we'll charge you court costs."

Driver: "Officer, I wasn't speeding"

Officer: "Nonsense. Of course you were. You're driving a red car. Everyone knows that people who drive red cars speed."

For me, this is about the *science*, and the *science fiction* of the anti-doping laboratory that analyzed Landis's sample.

I have now spent about 3,000 hours on this case. I have looked at the documents. I have learned about the science. I have read the operating manuals for the machines. I have conferenced with attorneys and with experts. In addition, I have given a public slide show about the case, across the United States, more than 25 times. All pro bono. All at no charge.

Working pro bono has afforded me an advantage not easily available to anyone paid for by the United States Anti-Doping Agency (USADA) or Landis. I am *not* bound by the WADA Code of Ethics<sup>2</sup> (also called the WADA Code of Silence, and the WADA Omerta). I *can* assist an athlete. I *can* say what I want to. Most importantly, anytime I want to, *I can walk away*.

Helping Landis over the last 22 months has been part of my motivation.

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<sup>2</sup> Read Panel Arbitrator Chris Campbell's opinion about the WADA Code of Ethics on page 353.

However, my personal history has provided another motivation.

I have been a cycling coach and author for almost twenty years, and was a practicing physician for about the same period. My more fundamental background is that of a scientist and a logician. For me, science is about truth and the search for truth.

For over a decade, I wrote annual reviews of the literature of bicycling medicine and science. Each year I typically reviewed several thousand articles and abstracts.

The disregard for scientific rigor—shown by the laboratory and those who support its work—is an affront to me as a scientist. The work of the laboratory is a blot on science as much as it is on Landis's career. To me, any confusion about the failure of the laboratory is also confusion about science, is also confusion about truth.

I have read many thousands of e-mails, on-line posts, and other articles about this case. I have read opinions about doping in cycling, doping in sport, the character, or lack thereof, of witnesses for USADA and Landis.

I have read the opinions of numerous scientists, who like me, are appalled by the lack of quality in the work of the laboratory.

**What I have *not* read, is a *single non-WADA-biased scientist defend the work of the lab*.**<sup>3</sup>

When a traffic officer tickets a speeder, it *must* be because the driver is speeding, not because the officer has profiled a driver of a red car.

When a laboratory accuses an athlete of doping, it had better be, it *must* be about an accurate test that *proves* doping.

Bruce Goldberger, a laboratory expert (President of the American Academy of Forensic Sciences and Editor-in-Chief of *The Journal of Analytical Toxicology*) has stated: “This is the worst chromatography (in an official report) I have ever seen.”

In the case of this lab, the Laboratoire National de Dépistage du Dopage (LNDD), Landis's test proves numerous *violations* of laboratory standards and *incompetence*.

Furthermore, (1) the many documents that appear to me to be fraudulent and (2) the many statements made by USADA, the LNDD laboratory, and USADA's witnesses that appear to me to be outright fabrications suggest scientific misconduct/malfeasance and, for me, completely undermine the whole document package and process.<sup>4</sup>

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<sup>3</sup> One biased exception: At the CAS arbitration, non WADA-scientist Dwight E. Matthews defended the work of the lab. However, as his testimony revealed, his conclusion concerning the case was based, in part, on inappropriate discussions with USADA-advisor Larry Bowers rather than on documented evidence.

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<sup>4</sup> For a discussion of this important issue, please see page 21.



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Regarding “lies” and fraud” discussed throughout this book: The evidence shows documents that appear to me to have been fabricated and documents and testimony that have been shown to be false. A “lie” or “fraud” implies intent. Without direct admission on the part of USADA, LNDD, or its witnesses, the determination of intent is a judgment. It is my belief and judgment, based on a review of the evidence, that there was intent to deceive. I have laid out the evidence and reasons for this judgment. Source documents are referenced so that readers can form their own opinions.

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## Revisions

The bulk of this book was written before the AAA hearing.

### 2.0 Edition.

Includes CAS Evidence. Commentary on CAS decision is not included.

Added more information about scientific and legal misconduct; false statements. Page 21.

Added more information about lack of analyte identification in the IRMS test. Page 180.

Added more information about the different columns documented as having been used in the GC/MS and GC/C-IRMS machines. Page 188.

### 1.8 Edition.

Added information how the AAA panel failed their ruling, including press reports on page 354.

Added 'A' and 'B' sample workflow summaries on 108.

Added certification issue for use of DB-5ms column. Pages 88.

Added summary of IRMS identification failure on page 183.

Added Pujos reference reinforcing the need for compound identification, especially in Landis with corticosteroid use. Page 183.

Added: Does LNDD Have Identification Criteria? Page 180.

Added information how the lack of similar polarity chromatography columns in the GC/MS and GC/C-IRMS makes compound identification problematic and measurement analysis meaningless. Page 188.

Added Catlin quote in Appendix: Metabolic Positivity, Question 4, page. 281.

Added Appendix Testing Terms on page 329.

Noted that Joe Papp's original correspondence to me was unsolicited; it came without confidentiality attached. See page 404.

Added references to lack of correct column issue in ISL violation and overall discussions.

Minor formatting and grammatical changes.

Minor reformatting of chain of custody chapter and references to include Frelat testimony about no chain of custody documents demonstrating transfer of samples or aliquots.

Corrected links to tag correctly in PDF.

# Forward: Why the Wiki Defense?

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Floyd Landis won the 2006 Tour de France.

*The Wiki Defense* is about the science debunking Landis's allegedly positive test for testosterone on Stage 17.

It is also about the numerous apparently fraudulent documents and false statements provided by the LNDD laboratory and United States Anti-Doping Agency (USADA).

Coincident with the first edition of *The Wiki Defense*, Landis published his story, *Positively False*.<sup>5</sup>

We coined the term “Wiki Defense” for our open defense of this fatally flawed test.

We posted, online, the entire 370-page document package (doc pac) outlining the details of the claim of the lab, the Laboratoire National de Dépistage du Dopage (LNDD) and the United States Anti-Doping Agency (USADA) against Landis.<sup>6</sup>

We also posted the *What's Fair is Clear* slide show outlining some of the readily apparent problems with the claim.

With this document, we outline details of procedural and interpretative problems with the claim.

The document was very much our working defense, often written in point style, rather than as a narrative.

“Wiki wiki,” is a term that translates to “quick” or “hurry up” in Hawaiian. Of course, it is also the root word in [Wikipedia](#), the online collaborative encyclopedia.

The vast majority of anti-doping scientists in the world work for World Anti-Doping Agency (WADA)-accredited laboratories and are prohibited from assisting athletes in their defense.

By posting Landis's case publicly, we were able to rapidly *send out* to the public details of the flaws in the report as well as *receive from* the public comments that helped us learn more about the lab's errors.

This document represents the collaborative effort of our defense team. The nucleus of our team included Landis (who was very involved at every step); his ex-manager Will Geoghegan; attorneys Howard Jacobs, Maurice Suh, Kay Reeves, and Daniel Weiss; ex-UCLA Olympic Anti-Doping Laboratory Director of Client Services and attorney Paul Scott; and public relations experts Michael Henson and Brian Rafferty.

Key roles were also played by Landis's personal physician Brent Kay and Phonak team physician Denise Demir.

Our roughly dozen experts each made substantial contributions within their respective fields. Many of these experts worked pro bono—at no charge—because they were committed to righting an injustice.

David Brower, initially a complete stranger to Landis, independently posted multiple daily news reports, research, and commentary on a website devoted to Landis's case, *Trust But Verify*—<http://trustbut.blogspot.com/index.html?com>.

Finally, truly, our defense team included the public contributions made by readers of our online defense—including scores of scientists.

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<sup>5</sup> *Positively False: The Real Story of How I Won the Tour de France* (Hardcover) by Floyd Landis (Author), Loren Mooney (Author). Simon & Schuster. June 26, 2007.  
<http://www.amazon.com/gp/product/1416950230?ie=UTF8&tag=arniebakercyc-20&linkCode=as2&camp=1789&creative=9325&creativeASIN=1416950230>.

<sup>6</sup> The entire 370-page analytical dossier, “The Document Package,” can be downloaded at no charge from: <http://arniebakercycling.com/books/wiki.htm>.

## Make It Personal

Imagine that you have a check-up with your doctor.

Your doctor finds a spot on your arm, says it looks “suspicious” and says that it might be a skin cancer—specifically, a malignant melanoma.

Your doctor says: “Let’s take a biopsy.”

You ask: “What is going to happen?”

The doc says: “We’ll have to see.”

1. “If it’s melanoma, and not too deep, we can just take a few inches of skin and tissue around the spot.
2. If it’s a deep melanoma, we may have to amputate your arm. It’s drastic, but it could save your life.
3. Of course, if it is just a mole, nothing more needs to be done.”

The biopsy report comes back. It is a deep melanoma.

However, there are problems.

The laboratory did not use the proper procedure in processing your biopsy, and the improper staining procedure made it uncertain that the pathologist could make a correct analysis. He notes that he is calling it a deep melanoma—to be safe—but he is not certain.

In addition, there was a sample number mix-up. Although the laboratory is pretty sure that it was your tissue they were looking at, they are not absolutely certain. However, the lab had *manufactured* documents, *after the fact*, showing that the test was okay.

In addition, instead of processing your tissue immediately, it sat out in the open air a little too long, and the tissue was degraded—it broke down and could not be analyzed according to standard protocol.

Oh, and by the way, the tissue stain solution was twice as strong as it should have been. This may have made cells seem darker and more dangerous than they really are.

Would you let your arm be amputated?

You find out: This laboratory has had problems before, many problems, many times.

One time, the laboratory had called a biopsy melanoma, and suggested amputation—then had to withdraw its conclusions when it realized it had *mixed up* some samples. The correct sample was normal.

Another time, the laboratory had called a biopsy melanoma, and suggested amputation—then had to withdraw its conclusions when it realized that it had *overstained* a tissue sample. The redo, with proper staining, was normal.

Now, might you think: I could have lost my arm, and others may have lost theirs—who should not have. If there is some good that can come from this, maybe I can help make sure this does not happen again. Maybe I can improve the system, help bring public awareness to the need for better laboratory controls, better testing, better checks.

### *That is what we are doing here:*

- ***Bringing the details of Landis’s allegedly positive doping test out into the open. For all to see.***
- ***To show the massive number of procedural and interpretative errors.***
- ***To show the fabrications.***
- ***For Landis, and for all athletes.***
- ***For fairness.***

# What's What / Who's Who

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## The Alphabet Groups

**AAA:** The American Arbitration Association.

“Services to individuals and organizations who wish to resolve conflicts out of court.” [Link](#).

**AFLD:** L’Agence française de lutte contre le dopage.  
The French anti-doping agency. Created April 5, 2006. [Link](#).

**CAS:** Court of Arbitration for Sport.  
“[P]rovides for services in order to facilitate the settlement of sports-related disputes through arbitration or mediation.” [Link](#).

**COFRAC:** Comité Français d’Accréditation.  
The laboratory accrediting agency.  
[Link](#).

**LNDD:** Laboratoire National de Dépistage du Dopage.  
The French national anti-doping laboratory.  
[Link](#).

**UCI:** Union Cycliste Internationale.  
“[A] non-profit-making organization founded on 14 April 1900, is the association of the National Cycling Federations. Its headquarters are in Aigle, Switzerland.” [Link](#).

**USADA:** United States Anti-Doping Agency.  
“The U.S. Anti-Doping Agency (USADA) is the national anti-doping organization for the Olympic movement in the United States. The U.S. Congress recognized USADA as ‘the official anti-doping agency for Olympic, Pan American and Paralympic sport in the United States.’” [Link](#).

**WADA:** World Anti-Doping Agency.  
“[T]he international independent organization created in 1999 to promote, coordinate, and monitor the fight against doping in sport in all its forms.” [Link](#).

## Arbitrators, Attorneys, Witnesses

For a more detailed description of most of these individuals, see *Part 2* starting on page 351

**Amory,** John. Landis testosterone expert.

**Ayotte,** Christiane. USADA expert. Lab director, Montreal.

**Barnett,** Matthew. USADA attorney.

**Botre,** Francesco. AAA panel expert.

**Brenna,** Tom. USADA IRMS expert.

**Brunet,** Patrice. AAA arbitrator. Chair.

**Buisson,** Corrine. LNDD IRMS supervisor.

**Campbell,** Christopher. AAA arbitrator  
Landis selection.

**Catlin,** Don. USADA expert. Lab director. UCLA.

**Davis,** Simon. Landis IRMS machine expert.

**de Ceaurriz,** Jacques. LNDD director. Did not testify.

**Dunn,** Daniel. USADA attorney.

**Frelat,** Claire. LNDD IRMS operator.

**Garcia** Myriam. LNDD lab operator.

**Goldberger,** Bruce. Landis lab-procedure and T/E-ratio expert.

**Goodman,** Keith. Landis IRMS expert.

**Jacobs,** Howard. Landis attorney.

**Jumeau,** Janine. USADA IRMS instrument expert.

**Le Petit,** Gerard. LNDD machine outside-service agent.

**LeMond,** Greg. USADA witness. Ex-professional bicycle rider.

**Martin** Laurent. LNDD lab operator.

**McLaren,** Richard H. AAA arbitrator.  
USADA selection.

**Meier-Augenstein,** Wolfram. Landis IRMS expert.

**Mongongu,** Cynthia. LNDD IRMS operator.

**Papp,** Joe. USADA witness. Ex-professional bicycle rider.

**Paulsson,** Jan. CAS arbitrator.  
Landis selection.

**Reeves,** Kay. Landis attorney.

**Rivkin,** David. CAS arbitrator.  
USADA selection.

**Schänzer,** Wilhelm. USADA expert. Lab director. Cologne.

**Scott,** Paul. Landis consulting expert.

**Shackleton,** Cedric. USADA steroid expert.

**Sloan,** Jennifer. USADA attorney.

**Suh,** Maurice. Landis lead attorney.

**Tygart,** Travis. USADA inside counsel. Now CEO.

**Weiss,** Daniel. Landis attorney.

**Williams,** David. CAS arbitrator. Chair.

**Young,** Richard. USADA lead outside attorney.

## Other Acronyms

**ISL:** International Standard for Laboratories.  
WADA standards.

**ISO:** International Organization for Standardization.  
International standards adopted by WADA into its ISL.

**SOP:** Standard Operating Procedure.  
A lab’s own standard.



# Part 1: The Issues

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# Burden of Proof

## Burdens and Standards of Proof

“The *Anti-Doping Organization* (USADA) shall have the burden of establishing that an anti-doping rule violation has occurred.

The standard of proof shall be whether the *Anti-Doping Organization* has established an anti-doping rule violation to the comfortable satisfaction of the hearing body bearing in mind the seriousness of the allegation which is made.”<sup>7</sup>

## Methods of Establishing Facts and Presumptions

“Facts related to anti-doping rules violations may be established by any reliable means.”

“WADA-accredited laboratories are presumed to have conducted *Sample* analysis and custodial procedure in accordance with the *International Standard* for laboratory analysis.

The athlete may rebut this presumption by establishing that a departure from the *International Standard* occurred.

If the *Athlete* rebuts the preceding presumption by showing that a departure from the *International Standard* occurred, then the *Anti-Doping Organization* (USADA) shall have the burden to establish that such a departure did not cause the *Adverse Analytical Finding*.”<sup>8</sup>

### “World Anti-Doping Code Comment

The burden is on the Athlete to establish, by a preponderance of the evidence, a departure from the International Standard.

If the athlete does so, the burden shifts to the Anti-Doping Organization to prove to the comfortable satisfaction of the hearing body that the departure did not change the test result.”<sup>9</sup>

World Anti-Doping Code2003

**3.2.1** WADA-accredited laboratories are presumed to have conducted *Sample* analysis and custodial procedures in accordance with the *International Standard* for laboratory analysis. The *Athlete* may rebut this presumption by establishing that a departure from the *International Standard* occurred.

If the *Athlete* rebuts the preceding presumption by showing that a departure from the *International Standard* occurred, then the *Anti-Doping Organization* shall have the burden to establish that such departure did not cause the *Adverse Analytical Finding*.

**3.2.2** Departures from the *International Standard* for *Testing* which did not cause an *Adverse Analytical Finding* or other anti-doping rule violation shall not invalidate such results. If the *Athlete* establishes that departures from the *International Standard* occurred during *Testing* then the *Anti-Doping Organization* shall have the burden to establish that such departures did not cause the *Adverse Analytical Finding* or the factual basis for the anti-doping rule violation.

**3.2.1 Comment:** The burden is on the Athlete to establish, by a preponderance of the evidence, a departure from the International Standard. If the Athlete does so, the

burden shifts to the Anti-Doping Organization to prove to the comfortable satisfaction of the hearing body that the departure did not change the test result.

**Figure 1. WADA Code is clear. The athlete may rebut the presumption that the laboratory conducted the analysis in accordance with the International Standard for Laboratories. If a departure from the ISL occurs, the burden shifts to the Anti-Doping Organization.**

<sup>7</sup> WADA World Anti-Doping Code 1. (2003). 3.1.  
[http://www.wada-ama.org/rtecontent/document/code\\_v3.pdf](http://www.wada-ama.org/rtecontent/document/code_v3.pdf). Accessed Dec 28, 2006.

<sup>8</sup> WADA World Anti-Doping Code 1. (2003). 3.2.1.

<sup>9</sup> WADA World Anti-Doping Code 1. (2003). 3.2.1 Comment.

## ISL Violation

Violations of the WADA International Standard for Laboratories (ISL)<sup>10</sup> are found throughout the document package.

*Any* single violation is sufficient to shift the burden of proof back to USADA to show that the violation did not *cause* the adverse analytical finding.

Throughout this book, such violations are highlighted in red, as are other violations of the WADA code, WADA technical documents (TDs), the International Organization for Standardization (ISO 17025), and the laboratory's own Standard Operating Procedures (SOPs).

A summary of violations is found on page 269.

## ISL Violation Example

ISL 5.2.2.2 violation is discussed in detail on page 93.

There is no contemporaneous chain of custody. There is no record, for example, where the 'A' sample bottle was located at 11:25 AM on July 22, 2006. For more about this issue, see page 93.

## On "Technicalities"

In the context of a legal charge, some people use the word technicality to describe an obscure rule employed to nullify an otherwise valid accusation.

Technical arguments are something quite different, even though the words technical and technicality share a common etymology. Technical arguments, often scientific or specialized, are about the details.

"Getting off on a technicality" seems to imply underlying guilt in many people's minds. "Technicalities" are specifically put into rules for a reason: to genuinely assure that the innocent are not wrongly accused. They are not there to let the guilty be exonerated.

<sup>10</sup> WADA International Standard for Laboratories. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

Arnie's comment:

Generally, anti-doping organizations prove their case through the laboratory document package, and that is that. The laboratory does good work, and the onus is on the athlete.

In this case, the laboratory does not merit the presumption of having established a doping violation by reliable means, because, as discussed in more detail beginning on page 87, its method was not accredited.

Even if this method had been accredited, with the laboratory's numerous International Standard violations, it is up to USADA to prove that these departures did not cause the adverse analytical finding.

The rule is clear:

*USADA must prove that every single departure did not cause the adverse analytical finding.*

As Landaluce showed,<sup>11</sup> a single violation places a high burden on the anti-doping organization, a burden that justifiably holds the laboratory to the rules.

As the summary of violations shown on page 269 documents, there are multiple violations of more than *two dozen* separate rules.

<sup>11</sup> TAS 2006/A/1119 Union Cycliste Internationale (UCI) c/ Iñigo Landaluce Intxaurreaga & Real Federación Española de Ciclismo (RFEC). <http://www.tas-cas.org/fr/pdf/Landaluce.PDF>. Accessed Mar 2, 2007. In Landaluce, a 10% overlap in workload by the same analyst in the 'A' and the 'B' sample was noted as a violation of the ISL. For this violation, Landaluce was exonerated. 107. It was indeed for the UCI to demonstrate that the failure to meet point 5.2.4.3.2.2 of the ISL was not at the origin of the adverse finding. To the extent that the UCI did not succeed in doing so, the Panel's only possible conclusion is to exonerate Mr. Landaluce. 109. The Panel must watch over the respect of fundamental rules, considering the implications that its decision could have on the reputation, and therefore, the career of the athlete, if a disciplinary sanction were to be pronounced against him. 111. It is virtually impossible to prove a negative fact, in this case that the involvement of the same analyst in both analyses did not affect the result.

## Top Issues

*The test should be thrown out. The lab should be sanctioned.*

### They Lied<sup>12</sup>

- There is evidence of scientific misconduct/malfeasance.
- Vanishing acts: Records have disappeared.
- Magical appearances: Documents appear to have been fabricated.
- False statements: USADA, its experts, and the lab appear to have repeatedly made false statements.

### They Botched the Test in the First Place

The report is so full of errors that other conclusions are impossible. For example:

- Sample numbers are wrong.
- The chain of custody is flawed.
- Quality control standards failed, and the failures were ignored.
- Files have been overwritten/erased.

### They Never Even Identified Testosterone Properly

Two types of tests performed: The T/E (testosterone/epitestosterone) ratio test and the IRMS test.<sup>13</sup>

<sup>12</sup> The evidence shows documents that appear to have been fabricated and documents and testimony that have been shown to be false. A “lie” or “fraud” implies intent. Without direct admission on the part of USADA, LNDD, or its witnesses, the determination of intent is a judgment. It is my belief and judgment, based on a review of the evidence, that there was intent to deceive. I have laid out the evidence and reasons for this judgment starting on page 21. Source documents are referenced so that readers can form their own opinions.

<sup>13</sup> For descriptions of T/E and IRMS tests, see pages 150 and 176 respectively.

### T/E Ratio Test

The T/E ratio testing is non-compliant with basic science and WADA regulations and so does not meet the criteria for a positive test.

- Peaks were not identified according to *minimum* standards.

### IRMS Test

The IRMS (isotope ratio mass spectrometry, also called carbon isotope, synthetic, or exogenous) test results do not meet basic science or WADA criteria for a positive test.

- The lab has no Standard Operating Procedure (SOP) or validation study for peak identification.
- Peaks were not identified according to *minimum* standards.

Throughout this book, arguments are rated one to three stars.

### \*\*\*A-Level Arguments 3 Stars

Strongest arguments. Items may be case dispositive.<sup>14</sup>

### \*\*B-Level Arguments 2 Stars

Strong arguments

### \*C-Level Arguments 1 Star

Important, but weaker arguments.

Comments, highlighted in yellow, provide supplemental opinions.

<sup>14</sup> Case dispositive: sufficiently important to decide/end/dispose of the case.

## Negative Test

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*There is evidence of scientific misconduct/malfeasance.*

*Even if one ignores the misconduct, this test, with its scores of procedural and interpretative errors, is a negative test.*

### Scientific Misconduct, Misdirection, and Lies

Documents appear to have been doctored, rewritten, and fabricated.

In direct document production, including its briefs, USADA and the Laboratoire National de Dépistage du Dopage (LNDD, the laboratory) made numerous disingenuous and outright misstatements of fact.

USADA staff, specifically Larry Bowers, appears to have provided at least one USADA expert with information about LNDD laboratory methodology not available in discovery and not produced to Landis.

For a partial list and discussion of these deceptions, see page 21.

### Negative Test

Landis's test is negative. It does not show the use of banned testosterone.

His test has numerous procedural and interpretative errors.

*There is no valid scientific evidence showing that synthetic testosterone was present. The laboratory has not identified testosterone or its metabolites according to minimal standards.*

### The Lab (LNDD) Fails

#### False Positive

Landis's test is *not* a “false-positive” test. False-positive errors, relatively infrequent, are expected.

“False positive” refers to a *random* error. No test is perfect, and occasional results outside the range of normal do not necessarily mean a true positive.

#### Falsely Positive: Mistakes

“Falsely positive” vs. “false positive” may seem like a small semantic difference. However, the difference is important.

“Falsely (erroneously) positive” refers to *systematic* errors and *mistakes*.

Procedural errors may result in a falsely-positive test. Such errors should be corrected and the test properly recorded as negative.

- *Systematic errors* are reproducible inaccuracies that are consistently in the same direction. Systematic errors are often due to a problem that persists.
- *Mistakes* made in protocol, calculations, or in reading an instrument *are generally not considered in standard scientific error analysis*.

These errors, although sometimes very human, are not about expected errors. They are about the real-world frailties of laboratory personnel and machines.

Although test design often assumes that the experimenters are careful and competent, this is often not the case.



Let us be honest: People make mistakes, sometimes many; and machines and their software may not be properly designed or maintained.

Although some mistakes, boo-boos if you will, are acceptable, as you will see throughout this document, *the magnitude* of laboratory errors in this case is *appalling*.

As many stunned scientists and teachers have agreed, if these documents were submitted in a high school chemistry class, the student would fail.

### ***Negative Test: Wrongly Called Positive***

Even if all the mistakes are ignored—which they cannot be—the test is *still* not positive.

The laboratory made interpretative errors.

Interpretive errors occur when a properly conducted test is miscalled based on flawed criteria.

Interpretive errors are negative tests wrongly concluded to be positive. A negative test wrongly called positive should be corrected and the test properly recorded as negative.

As you will see, by the findings of every peer-reviewed scientific publication on the subject, by the standard of the largest anti-doping laboratory in the world, and by common sense, this is *not* a positive test.<sup>15</sup>

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<sup>15</sup> Details about IRMS interpretation can be found on pages 211, 216, 281, and 287.

## \*\*\*1. Lies and Fraud<sup>16</sup>

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In civil, criminal, and malpractice cases, a single forged document is often enough to make a case indefensible.

In Landis, documents appear to have been manipulated, altered, inaccurately “recreated” as original and as such, may be fraudulent. If true, the case against Landis should be dismissed, the laboratory decertified or closed, and the practices of USADA and the LNDD should be immediately reviewed.

We are not considering sloppy practices and mere incompetence, problems that also exist in this case and are discussed elsewhere throughout this book. In this section, we are discussing apparently deliberate deceptions and fraud.<sup>17</sup>

Even before we get to the scientific arguments, the entire document package should be discounted.

If the laboratory is shown to attempt to pass off *any* false documents as true, none of the records can be trusted.<sup>18</sup>

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<sup>16</sup> As already noted, the evidence shows documents that appear to have been fabricated and documents and testimony that have been shown to be false. A “lie” or “fraud” implies intent. Without direct admission on the part of USADA, LNDD, or its witnesses, the determination of intent is a judgment. It is my belief and judgment, based on a review of the evidence, that there was intent to deceive. Source documents are referenced so that readers can form their own opinions.

<sup>17</sup> Consider also the context: LNDD, the laboratory, has admitted or been found to have repeatedly violated the rules in order to allege a doping violation. A few examples: (1) In Landaluce, the laboratory director admitted to violating the “same operator” rule (discussed in detail on page 145) because of work overload.

(2) [The Vrijman report](#) found: “The LNDD violated applicable rules on athlete confidentiality by commenting publicly on the alleged positive findings, especially in relation with a particular rider, Lance Armstrong.”

(3) In Landis, the operators testified that the IsoPrime 2 machine had not been validated. Frelat stated that the laboratory used it anyway when the IsoPrime1 machine was being serviced. (Discussed in detail on page 89.)

<sup>18</sup> “The lab should just be a fact-gatherer, but the WADA system is designed in a way that the labs are not just objective fact gatherers, but part of the body of prosecution.” For a discussion of this and other failings of the WADA system, see page 263.

We also present confirmation, in the testimony of USADA expert Matthews, that USADA supplied critical information about the nature of quality controls in the lab to him, information in direct contradiction to the information it originally gave to us, and information for which no laboratory documentation has been provided.

Shady testimony of experts is not discussed in this section.

It is a fact of litigation that paid expert witnesses occasionally tailor their testimony to support the position of the side that has hired them.

While the numerous self-contradictory statements and biases of USADA’s witnesses, in my mind, completely undermine their credibility, that issue is discussed separately: specifically starting on page 372, and generally throughout this book.

What is discussed in this section are the frankly false and misleading statements made by USADA and its experts with respect to critical factual or scientific points in Landis’s case.

Here is a listing of issues to be discussed in this section:

- Vanishing acts. Starts on page 25.  
Official documents and records that might help Landis are altered, deleted, or destroyed.
- Magical appearances. Starts on page 31  
Information that might help USADA/LNDD appears in late discovery. The documents appear fraudulent.
- More than a dozen instances of misdirections, failures to be candid, and statement revisions starting on page 50.

## Role of Witnesses

The CAS arbitrators determine what weight to give to the arguments and testimony of attorneys, documents, and witnesses.

In California, juries may be given standard instructions. By way of example, below is reproduced California Jury Instruction 5300.<sup>19</sup>

Consider the section I highlighted concerning untruthful testimony.

### *California Jury Instruction 5003. Witnesses*

A witness is a person who has knowledge related to this case. You will have to decide whether you believe each witness and how important each witness's testimony is to the case. You may believe all, part, or none of a witness's testimony.

In deciding whether to believe a witness's testimony, you may consider, among other factors, the following:

- (a) How well did the witness see, hear, or otherwise sense what he or she described in court?
- (b) How well did the witness remember and describe what happened?
- (c) How did the witness look, act, and speak while testifying?
- (d) Did the witness have any reason to say something that was not true? Did the witness show any bias or prejudice? Did the witness have a personal relationship with any of the parties involved in the case? Does the witness have a personal stake in how this case is decided?
- (e) What was the witness's attitude toward this case or about giving testimony?

Sometimes a witness may say something that is not consistent with something else he or she said. Sometimes different witnesses will give different versions of what happened. People often forget things or make mistakes in what they remember. Also, two people may see the same event but remember it differently. You may consider these differences, but do not decide that testimony is untrue just because it differs from other testimony.

**However, if you decide that a witness deliberately testified untruthfully about something important, you may choose not to believe anything that witness said.** On the other hand, if you think the witness testified untruthfully about some things but told the truth about others, you may accept the part you think is true and ignore the rest.

Do not make any decision simply because there were more witnesses on one side than on the other. If you believe it is true, the testimony of a single witness is enough to prove a fact.

You must not be biased in favor of or against any witness because of his or her disability, gender, race, religion, ethnicity, sexual orientation, age, national origin, [or] socioeconomic status[, or [insert any other impermissible form of bias]].

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<sup>19</sup> September 2003; Revised April 2004, April 2007. (Pub.1283) LexisNexis® Matthew Bender®, Official Publisher, 800-533-1637. [www.lexisnexis.com/bookstore](http://www.lexisnexis.com/bookstore).

### AAA Arbitrator Campbell: LNDD Not Trustworthy

In his AAA dissent opinion, arbitrator Campbell's first concern was that the laboratory was dishonest. He started by quoting the New Testament:

"Whoever is dishonest with very little will also be dishonest with much... So if you have not been trustworthy in handling worldly wealth, who will trust you with true riches..."  
*Luke 16:10.*

Campbell next elaborated about the LNDD laboratory's untrustworthiness, lack of compliance with the International Standard for Laboratories (ISL), and legal and ethical failures. :

1. From the beginning, the Laboratoire National de Dépistage et du Dopage ("LNDD") has not been trustworthy. In this case, at every stage of testing it failed to comply with the procedures and methods for testing required by the International Standards for Laboratories, Version 4.0, August 2004 ("ISL") under the World Anti-Doping Code, 2003 ("WADA Code"). It also failed to abide by its legal and ethical obligations under the WADA Code. On the facts of this case, the LNDD should not be entrusted with Mr. Landis' career.

2. Mr. Landis is only required to prove the facts he alleges in this case by a mere balance of the probabilities. In many instances, Mr. Landis sustained his burden of proof beyond a reasonable doubt. The documents supplied by LNDD are so filled with errors that they do not support an Adverse Analytical Finding. Mr. Landis should be found innocent.<sup>20</sup>

<sup>20</sup> AAA Minority Award. Chris Campbell Opening Statement. The opinions of the AAA panel are linked at: <http://arniebakercycling.com/books/wiki.htm>.

UNITED STATES ANTI-DOPING AGENCY v. FLOYD LANDIS  
American Arbitration Association No. 30 190 00847 06  
North American Court of Arbitration for Sport Panel  
Award Dated September 20, 2007

Christopher L. Campbell, dissenting.

I.

INTRODUCTION

"Whoever is dishonest with very little will also be dishonest with much. . . So if you have not been trustworthy in handling worldly wealth, who will trust you with true riches . ." *Luke 16:10.*

1. From the beginning, the Laboratoire National de Dépistage et du Dopage ("LNDD") has not been trustworthy. In this case, at every stage of testing it failed to comply with the procedures and methods for testing required by the International Standards for Laboratories, Version 4.0, August 2004 ("ISL") under the World Anti-Doping Code, 2003 ("WADA Code"). It also failed to abide by its legal and ethical obligations under the WADA Code. On the facts of this case, the LNDD should not be entrusted with Mr. Landis' career.

2. Mr. Landis is only required to prove the facts he alleges in this case by a mere balance of the probabilities.<sup>1</sup> In many instances, Mr. Landis sustained his burden of proof beyond a reasonable doubt. The documents supplied by LNDD are so filled with errors that they do not support an Adverse Analytical Finding. Mr. Landis should be found innocent.

**Figure 2. The opening of AAA Arbitrator Chris Campbell's opinion is focused on the dishonesty of the LNDD laboratory.**

Arnie's comment:

On more than two dozen occasions, documented in the pages that follow in this section, I believe that USADA, the LNDD, and USADA's witnesses have either presented false information or testified untruthfully about important issues.

I therefore am skeptical about everything they have said.

Background issues are one thing.

Lies and cover-ups are another.

To expand, by way of just three examples:

Example 1: Vanishing document.

Making an honest mistake in documenting Floyd's sample number may or may not be important in establishing that the sample tested was, in fact, his.

Resubmitting an "original" report with the wrong number "corrected"—without notation as to the person making the correction and the date—makes me think the lab has something to hide and is dishonest. Read about this issue on page 25.

Example 2. Magical appearance.

Failure to perform a monthly instrument performance check may or may not be important in establishing the accuracy of a result.

Fabricating a document to provide results for a missing test is fraud. Read about this issue on page 37.

Example 3: False statement.

Chain of custody is an important issue in this case. For example, there is often a lack of documentation concerning the sample bottle location and the transfer of the sample from one operator to another.

The United States Anti-Doping Agency made a false statement: it denied the need to document the sample bottle location. This makes me think that USADA and the lab have something to hide. Read about this issue on page 50.



## \*\*\*1.1 Vanishing Acts

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Official documents and records that might help Landis and show the truth, are altered, deleted, or destroyed.

### 1A. Electronic Data Records Destruction

Landis asked to see the original electronic data files from his analysis. The files on the machine's hard drive were destroyed shortly before Landis's team arrived at the laboratory.

Here are the details:

#### Adapted Attorney Suh Submission

Since the original submission of Landis's requests for discovery, all the way up to the second order from the Arbitration Panel for USADA to produce documentation, it has been Landis's contention that the original Stage 17 sample analyses had been done improperly on a machine using outdated, potentially flawed software.

Landis's defense team argued that access to the original Electronic Data Files would allow the data to be run on more modern and accurate software. The results might disprove the original findings of the LNDD lab.

The Arbitration Panel granted this request and ordered USADA to produce the Electronic Data Files for all relevant sample analyses for Landis performed at the LNDD.

As a result, USADA then argued that the Electronic Data Files were easily manipulated. They claimed to the Panel that they feared Landis's team would somehow falsify results and they requested that the Panel nominate an expert for the removal of these files, to ensure that they would not be altered, tampered with or manipulated and that the integrity of the files could be verified and authenticated.

The Panel-appointed expert would follow a pre-agreed protocol to assure the preservation of the integrity of the original files.

The Panel-appointed expert would then provide to the parties verified original copies for further analyses.

The Panel appointed Dr. Francesco Botrè as its representative.

#### *April 26, 2007: Electronic Files Retrieval Day*

Simon Davis arrives at LNDD on April 26, 2007 to act as Landis's expert observer in the removal of the Electronic Data Files from the IsoPrime OS2 machine (Stage 17 results) and the Electronic Data Files from the IsoPrime MassLynx machine (B sample re-testing) to be performed by Dr. Botrè.

Dr. Botrè arrives at LNDD on April 26, 2007, prepared to execute his Panel-appointed role in the retrieval of the original files from their native locations, thus ensuring that there is no tampering or unauthorized access of the files and that the original files are intact with their integrity preserved.

Upon arrival and inspection, several issues became clear:

- *In advance* of the arrival of Dr. Botrè and Simon Davis, the hard drive from the IsoPrime OS2 machine, containing the Stage 17 samples, had been removed from the machine by LNDD staff and installed in a PC. This action was performed in the absence of oversight or witness of Landis's expert observer or Dr. Botrè.
- *In advance* of the arrival of Dr. Botrè and Simon Davis, all Electronic Data Files on the IsoPrime OS2 hard drive had been removed by the LNDD from the drive and burned to a CD-ROM without oversight or witness of Landis's expert observer or Dr. Botrè.

- *In advance* of the arrival of Dr. Botrè and Simon Davis, the relevant files for the Stage 17 sample analyses had been opened for unknown reasons and re-saved by the LNDD, corrupting the integrity of the files time stamp authentication, without oversight or witness of Landis's expert observer or Dr. Botrè.
- Finally, *in advance* of the arrival of Dr. Botrè and Simon Davis, the hard drive from the IsoPrime OS2 machine had been "wiped clean" by the LNDD, destroying all the original files, thereby providing no way to verify the authenticity of the electronic data files for the Stage 17 analyses.

The LNDD explained that they removed the 'A' sample EDFs on January 1, 2007 due to the hard drive being full.

This raises a few issues:

1. USADA's original argument for the necessity of Dr. Botrè in the first place was that the electronic data files could be easily manipulated. Now Landis faced precisely the same concern: Had the files been manipulated?
2. If the hard drive was full and needed purging on January 1, 2007, then the 'B' sample would also have been purged.
3. If the procedure to purge the hard drive requires removal from the IsoPrime OS2, then there should be a corresponding SOP for this activity.
4. If there is an SOP for this, it should outline the conditions/procedure for reformatting the hard drive.

### ***Files Don't Match***

On May 4, 2007, panel-appointed expert Dr. Botrè and Landis's expert Simon Davis find that the reprocessed files do not result in original Stage 17 results when run on the same machine, with the same software, and with the same operator performing the work.

Some of the results differ from the original by more than twice the LNDD laboratory total uncertainty budget for an entire analysis.

***The files and results cannot be authenticated.  
For more information, see page 206.***

## 1B. Overwriting of Files

The laboratory does not keep a complete record of its work. This is not only bad science; it is against the rules.

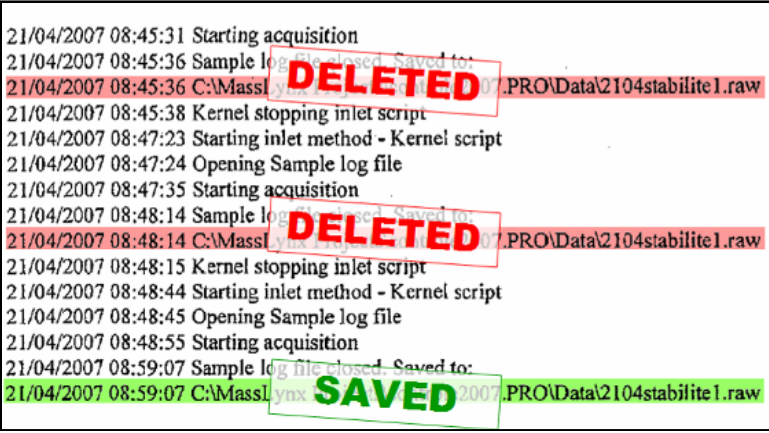
In April, 2007, Landis observers were permitted to observe LNDD operators perform retesting of seven previously negative Landis 2006 Tour de France samples.

In May, 2007, Landis observers were permitted to observe LNDD operators reprocess the previously positive Landis Stage 17 electronic data files.

Landis observers saw that the method of the laboratory operators is to repeatedly manually reprocess data and overwrite files, without keeping records of previous processing.

The electronic data files show numerous instances of overwriting of files, and consequent file deletion.

For more on this issue, see page 255.



The screenshot displays a log file with timestamps and actions. Two entries are highlighted with red boxes and the word 'DELETED' in large red letters: '21/04/2007 08:45:36 C:\Massl\yinx\2007\PRO\Data\2104stabilite1.raw' and '21/04/2007 08:48:14 C:\Massl\yinx\2007\PRO\Data\2104stabilite1.raw'. A third entry is highlighted with a green box and the word 'SAVED' in large green letters: '21/04/2007 08:59:07 C:\Massl\yinx\2007\PRO\Data\2104stabilite1.raw'. The log entries include: '21/04/2007 08:45:31 Starting acquisition', '21/04/2007 08:45:36 Sample log file closed. Saved to:', '21/04/2007 08:45:38 Kernel stopping inlet script', '21/04/2007 08:47:23 Starting inlet method - Kernel script', '21/04/2007 08:47:24 Opening Sample log file', '21/04/2007 08:47:35 Starting acquisition', '21/04/2007 08:48:14 Sample log file closed. Saved to:', '21/04/2007 08:48:15 Kernel stopping inlet script', '21/04/2007 08:48:44 Starting inlet method - Kernel script', '21/04/2007 08:48:45 Opening Sample log file', '21/04/2007 08:48:55 Starting acquisition', and '21/04/2007 08:59:07 Sample log file closed. Saved to:'.

Figure 3. One example of deleted files. The electronic data files of April 21, 2007, show that stability test files were repeatedly overwritten and thereby deleted.

## 1C. Document Doctoring

**ISO Violation<sup>21</sup>**  
**WADA Violation**

TD2003LCOC:<sup>22</sup>

“Any forensic corrections that need to be made to the comment should be done with a single line through and the change should be initialed and dated by the individual making the change. No white out or erasure that obliterates the original entry is acceptable.”

ISO 17025. 4.13.2.3:<sup>23</sup>

“When mistakes occur in records, each mistake shall be crossed out, not erased, made illegible or deleted, and the correct value entered alongside. All such alterations to records shall be signed or initialed by the person making the correction. In the case of records stored electronically, equivalent measures shall be taken to avoid loss or change of original data.”

## USADA0288.<sup>24</sup>

To read more about the numerous instances of non-forensic corrections in the document package, see page 109.

On page 113 we show that USADA0288 documents a wrong number. Both the laboratory ID and sample number are incorrect.

Landis was charged by WADA and by AFLD (Agence Française de Lutte contre le Dopage). (These parallel proceedings arising from the same offence represent a form of double jeopardy.)

In the AFLD docs, the error vanishes. The number has been overwritten, without initial or date, and changed to Landis's number.

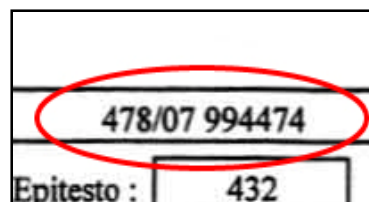


Figure 4. USADA0288. The sample number in the document package report is not Landis's. The whole page is shown on page 109.

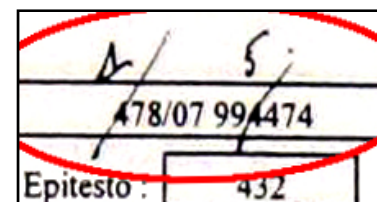


Figure 5. AFLD document. Scientific misconduct/malfeasance? The same page has been altered, post USADA submission, in the LNDD submission to AFLD. Was LNDD Director Ceaurriz responsible? See the text.

<sup>21</sup> For more on the significance of ISL and other violations, see page 16.

<sup>22</sup> WADA TD2003LCOC. Laboratory Internal Chain of Custody. (2003). [http://www.wada-ama.org/rtecontent/document/chain\\_custody\\_1\\_2.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/chain_custody_1_2.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.

<sup>23</sup> International Organization for Standardization. ISO 17025. 4.13.2.3. (2005). <http://www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=39883>. Accessed Dec 28, 2006.

<sup>24</sup> For information on Bates numbering, the method used to identify documents, as well as a summary of the documents received in discovery, see page 335.

Two cross-outs are handwritten.  
There is no date. There is no initial or signature.  
There is no notation as to the basis for the change.  
This change was not made at the same time as the record was made; it was made *after* the report was already sent out to USADA.

It is uncertain when this change was made. It may have been after I pointed out this problem in public and in on-line *What's Fair is Clear* slide shows.

We know that the LNDD laboratory director Jacques de Ceurritz knew about this issue. The lab admitted the error and the director is quoted as saying:

“It’s an error as regards numbering, a typing error which has no significance whatsoever on the findings in the samples,” said de Ceurritz, adding that the World Anti Doping Agency (WADA) was aware of the incident. “These little mistakes happen. They are corrected, and noted.”<sup>25</sup>

Both documents are certified as copies of the original. How many originals are there?

Arnie’s comment:

It is one thing to make a clerical or typing error.  
This is something different.

As LNDD Director Ceurritz said: “These little mistakes happen. They are corrected, and noted.”  
Corrected is one thing; noting is another. There was no notation.

Attempting to rewrite a documented and established record is egregious and a tip-off to scientific misconduct/malfeasance.

This is an ill-advised effort at cover-up.

If the sample was indeed Landis’s, we have therefore shown that a technician can key-in erroneous information under the radar of the observers.

As discussed on page 22, with evidence that the LNDD laboratory is willing to alter the official record, we have good reason to impugn *all* the intentions, procedures, and testimony of LNDD. Manipulation of the sample and results cannot be ruled out.

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<sup>25</sup> LNDD Director Jacques de Ceurritz quoted in VeloNews. November 15, 2006.  
<http://www.velonews.com/article/11202>. Accessed May 7, 2008.

## 1D. Document Omission

USADA0008.<sup>26</sup>

USADA0008 and what should be page 5 in their numbering system is omitted from LNDD's filing of the document package with AFLD.

As in USADA0288 discussed immediately above, this page was in the original *What's Fair is Clear* slide show, showing that the number 995475 appears.

This is not Landis's sample number. It is from another athlete, examined in the laboratory at the same time. For more discussion about this and other sample number mix-ups, see page 113.

Arnie's comment:

As discussed above, in *Document Doctoring*, it is uncertain when this filing took place.

I find it curious, and suspicious, that this particular page should be left out of the AFLD document package.

Figure 6 shows a document with two tables of analytical results. The top table, titled "RESULTATS ANORMAUX ET RESERVES", lists various parameters (pH, Dépistage, NB) for sample 995475. The bottom table, titled "RESULTATS NORMAUX", lists parameters (pH, Dépistage, NB) for sample 995474. Both sample numbers are circled in red.

Figure 6. USADA0008. The sample number 995475 and the sample number 995474 both appear. Are there two samples whose values are being reported, or has the laboratory made a documentation error?

<sup>26</sup> For information on Bates numbering, the method used to identify documents, as well as a summary of the documents received in discovery, see page 335.

## \*\*\*1.2 Magical Appearances

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At least four separate documents produced in discovery appear to have been fabricated.

Case-dispositive difficulties for USADA appear to have been surprisingly solved by the finding of documents not previously provided; documents whose existence was previously implicitly or expressly denied.

As noted by Landis's attorney Suh in his post CAS-hearing closing brief:

“When the AAA Panel notes that LNDD failed to monitor linearity in compliance with its SOP, a new linearity testing document magically appears to help repair the damage.”

“When he [Landis] identifies an error with the column, a witness magically appears to clear up the error, but the documents are fraudulent.”

“These incidents are not the hallmarks of a search for the truth, but of a desire to win at all costs.”<sup>27</sup>

Also discussed in this section: USADA provided at least one of its expert witnesses with information not in evidence.

USADA expert-witness Dwight Matthews needed information to come to his conclusions. USADA came up with the “the facts” that suited their arguments.

This information was contrary to previously-provided USADA statements and USADA expert-witness testimony. These statements and testimony had been proven false or indicative of failure of laboratory quality control at the AAA hearing.

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<sup>27</sup> Landis CAS Closing Brief, April 18, 2008, p.4.  
Linked at: <http://arniebakerrecycling.com/books/wiki.htm>.



## 1E. August 2006 Linearity Testing

LNDD2020, LNDD0313, LNDD0320, LNDD0327, GDC0875.

Linearity testing is one of many quality control tests needed to assure that the IRMS instrument is working correctly.

One of the issues in this case, as described in more detail on page 228, is that the laboratory's SOP indicates that linearity quality-control tests are to be performed monthly.<sup>28</sup>

In its AAA pre-hearing brief, USADA stated: "On a monthly basis the instrument's linearity is checked."<sup>29</sup>

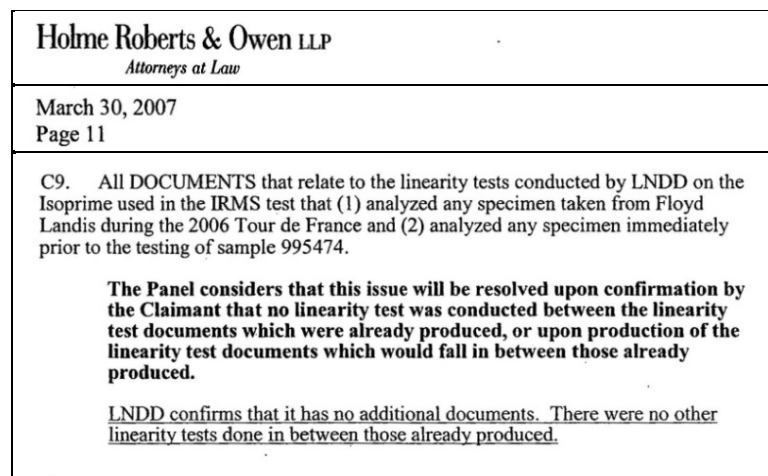
Documents we had been provided in discovery leading up to the AAA hearing indicated that the laboratory had failed to conduct a linearity test in the month of Landis' 'B' sample test, August 2006.

We had asked USADA/LNDD to produce all the linearity documents around the period in which Landis was tested.

When we noticed that the August test was missing, we asked again.

USADA confirmed that there were no more linearity runs to be found.

"LNDD confirms that it has no additional documents. There were no other linearity tests done in between those already produced."<sup>30</sup>



**Figure 7. When Landis noticed that no linearity test had been performed in August, 2006, he asked USADA to confirm this. USADA's attorneys clearly stated there were no other linearity tests performed.**

The AAA arbitrators determined that the absence of an August linearity test was an ISL violation.<sup>31</sup>

On February 27, 2008, three weeks before the CAS hearing, USADA submitted information to show that a linearity test had indeed been performed in August 2006.

A screenshot of the purported August linearity test is shown in Figure 8.

<sup>28</sup> SOP I-N-29, 4.2 6.2 LNDD0547. Monthly maintenance.

<sup>29</sup> USADA AAA Pre-Hearing Brief, April 16, 2007, p.24, ¶53.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>30</sup> Holme Roberts & Owen letter to the AAA panel dated March 30, 2007, p. 11.

<sup>31</sup> "218. Accordingly, the Respondent has rebutted the presumption that the Lab failed to adhere to the ISL in failing to check the linearity of the IRMS instrument on a monthly basis as provided for in its ISO 17025 accreditation. It is now for the Claimant to demonstrate that this departure did not cause the AAF." AAA Award. September 20, 2007.

Data Processing Results			
Data File Name	:	DATA_012	
Folder	:	STAB3	
Sample Name	:	Linearite 2	
Sample ID	:		
Sample Position	:	1	
Injection Size	:	0.0000	
Sample Type	:	Sam	
Method	:	CO2-LIN	
Batch Name	:	STAB3	
RunTime User	:	micromass	
Acquisition Time	:	14:23:26	Date : 21/08/06
Current Time	:	14:34:51	Date : 21/08/06

LNDD2020

**Figure 8. LNDD2020.** A document purportedly from an August 2006 linearity performance check of the Isoprime1 instrument. The file is labeled STAB3.

However, for three reasons, I believe this document is a forgery.

1. The apparent method of the laboratory is to sort files into folders by date. The linearity tests performed in June, July, and September of 2006 all have batch and folder names that match the date of the instrument performance check. See Figure 9, Figure 10, and Figure 11 respectively.

The alleged August 2006 linearity check has the atypical folder and batch name “STAB3.” See Figure 8.

Data Processing Results			
Data File Name	:	DATA_008	
Folder	:	260606	
Sample Name	:	Linearite 1	
Sample ID	:		
Sample Position	:	8	
Injection Size	:	0.0000	
Sample Type	:	Sam	
Method	:	CO2-LIN	
Batch Name	:	260606	
RunTime User	:	micromass	
Acquisition Time	:	11:23:11	Date : 26/06/06

LNDD0313

**Figure 9. LNDD0313.** Linearity run of June 26, 2006. The file is labeled 260606.

Data Processing Results			
Data File Name	:	DATA_007	
Folder	:	310706	
Sample Name	:	Linearite 1	
Sample ID	:		
Sample Position	:	1	
Injection Size	:	0.0000	
Sample Type	:	Sam	
Method	:	CO2-LIN	
Batch Name	:	310706	
RunTime User	:	micromass	
Acquisition Time	:	11:58:36	Date : 31/07/06

LNDD0320

**Figure 10. LNDD0320.** Linearity run of July 31, 2006. The file is labeled 310706.

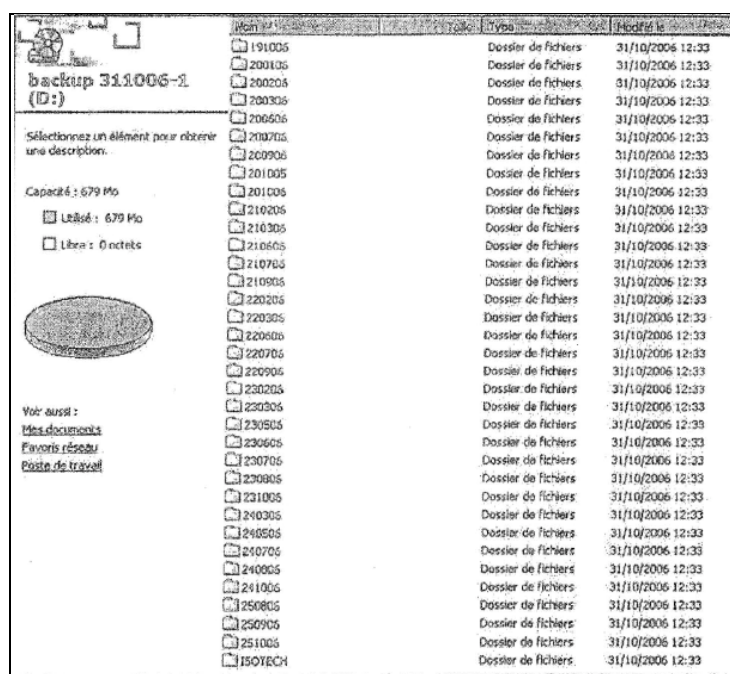
Data Processing Results			
Data File Name	:	DATA_005	
Folder	:	250906	
Sample Name	:	Linearite 1	
Sample ID	:		
Sample Position	:	2	
Injection Size	:	0.0000	
Sample Type	:	Sam	
Method	:	CO2-LIN	
Batch Name	:	250906	
RunTime User	:	micromass	
Acquisition Time	:	11:12:21	Date : 25/09/06
Current Time	:	11:23:46	Date : 25/09/06

LNDD0327

**Figure 11. LNDD0327.** Linearity run of September 25, 2006. The file is labeled 250906.

2. While at the laboratory for the reprocessing of Landis's 'A' and 'B' samples, our observers obtained screen captures of all of the folders on the backup disc purportedly representing all the information on the IsoPrime1 hard drive as of October 31, 2006.<sup>32</sup> Entries for the linearity runs 260606 (June 26, 2006), 310706 (July 31, 2006), and 250906 (September 25, 2006) all appear in the screen shot records of the hard drive.

***There is no folder labeled STAB3 present.***



**Figure 12. GDC0875. One of the screen shots of the backup folders from the IsoPrime1 machine. There is no folder named STAB3 in any of the records of the contents of the IsoPrime1 hard drive as of October 31, 2006.**

<sup>32</sup> The complete record of screen shots of all the folders on the backup disc purportedly representing all of the information on the IsoPrime1 hard drive as of October 31, 2006 is linked at: <http://arniebakercycling.com/books/wiki.htm>.

3. I do not find the testimony of Frelat, the operator who claims to have found this document, credible. Here are just a few reasons:

- a. Frelat waffles on whether she found the alleged August linearity run with fellow laboratory worker Claire Buisson or alone, just a few weeks earlier. At the AAA hearing, Frelat claimed an excellent memory, recalling exact reasons for time gaps and file erasures (separate issues discussed starting on page 249 and page 255) that had occurred a month in the past.<sup>33</sup>

- b. Frelat testifies that she went to the archives to find copies of the three known linearity tests, found them, yet continued to look for the August linearity run.

- c. Frelat testifies that she used the term "LNDD staff found" in her declaration, rather than "I found" because "LNDD staff found" was shorter. (In French, "j'ai trouvé" vs. "le personnel du LNDD a trouvé.")

- d. Frelat states the linearity tests for June, July, and September were found in boxes labeled "technical annex, technical attachment, the month involved in 2006, IsoPrime 1." She states she found the alleged August linearity test in a box labeled "technical annex, technical appendix, August 2006, IsoPrime 1."

<sup>33</sup> An example of Frelat's apparent excellent memory at the AAA hearing:

AAA Hearing Transcript Page 696

10 [Q.] If you go back up, actually, you can

11 see where the analysis began at 18:28:28 where

12 it says Commencing Analysis. So --

13 A. In fact, the wait time was the wait

14 time during which the second analysis finished

15 on the GC/MS, so that it then goes to the

16 IsoPrime.

17 Q. And you remember that occurring?

18 THE INTERPRETER: You remember that

19 occurring?

20 Q. Yes.

21 A. Yes, I do have that image. I do

22 have that memory.

23 Q. In your head, you have that memory?

24 A. Yes.

The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

e. Although she was the operator who allegedly performed the linearity tests, in discovery—when Landis asked for the documents, repeatedly—she was never asked about the missing test.

Here is Frelat's CAS testimony in response to questioning by Landis attorney Suh.<sup>34</sup>

CAS Hearing Transcript Page 880

1           CLAIRE FRELAT - DIRECT  
11           Q.     Ms. Frelat, who -- when I  
12     read the first sentence it says "LNDD  
13     staff found the printed data from the  
14     August 2006 linearity test." Who  
15     actually found the August 2006  
16     linearity test? If you look up on the  
17     screen.  
18           A.     I went into the archives. I  
19     think I -- I think I was there, I think  
20     it was with Corinne, but I don't really  
21     know.  
22           Q.     Your testimony is you went  
23     into the archives with Ms. Buisson,  
24     correct?  
25           A.     I don't -- I don't know

CAS Hearing Transcript Page 881

1           CLAIRE FRELAT - DIRECT  
2     whether it was Ms. Buisson.  
3           Q.     What was the date that you  
4     went to the archives?  
5           A.     I don't remember the exact  
6     date.  
7           Q.     And do you remember why you  
8     went to the archives?  
9           A.     I think it was to look for  
10    the printouts of the linearity tests.  
11           Q.     When you say you think it  
12    was to look for the printouts of the  
13    linearity tests, you're not sure that  
14    was the reason, right?

15           A.     I think I went there to look  
16    for the other linearity tests, the ones  
17    that were provided in the -- on the CDs  
18    and I came across the box of other  
19    ones.  
20           Q.     So your testimony is that  
21    when you write "LNDD staff found the  
22    printed data from the August 2006  
23    linearity test," you're referring to  
24    yourself?  
25           A.     I'm a member of the LNDD

CAS Hearing Transcript Page 882

1           CLAIRE FRELAT - DIRECT  
2     staff, but I don't remember who I went  
3     there with.  
4           Q.     You found -- when you say  
5     the LNDD staff, you remember yourself  
6     going, you and someone else; is that  
7     correct?  
8           A.     Yes.  
9           Q.     And you found the August  
10    2006 linearity test where?  
11           A.     In an archive box.  
12           Q.     And you found it in an  
13    archive box separate from the other  
14    linearity tests?  
15           A.     Yes.  
16           Q.     And what was the label on  
17    that archive box?  
18           A.     Well, technical annex,  
19    technical appendix.  
20           Q.     So --  
21           MR. PAULSSON: She's not  
22    done.  
23           MR. SUH: Oh, excuse me.  
24           A.     August 2006, with several  
25    instrument names including IsoPrime 1,

CAS Hearing Transcript Page 883

1           CLAIRE FRELAT - DIRECT  
2     but I don't remember the others.  
3           Q.     So your testimony was you  
4     went to go look for the other linearity  
5     tests, correct?  
6           A.     Yes.  
7           Q.     And did you find the other  
8     linearity tests?  
9           A.     Yes.

<sup>34</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

10 Q. And did you find the other  
11 linearity tests before you found the  
12 August linearity tests?  
13 A. I don't remember.  
14 Q. And where did you find the  
15 other linearity tests, the ones that  
16 were produced?  
17 A. In the archive boxes.  
18 Q. And what was the label on  
19 the archive box that contained the  
20 other linearity tests, the ones that  
21 were produced?  
22 A. Technical annex, technical  
23 attachment, the month involved in 2006,  
24 IsoPrime 1 and the name of other pieces  
25 of equipment.

CAS Hearing Transcript

1 CLAIRE FRELAT - DIRECT  
2 Q. Why would you continue to look  
3 if you thought the August linearity test  
4 wasn't done?  
5 A. But I didn't think that the  
6 test had not been done.  
7 Q. If you didn't think the test  
8 had been done why hadn't you looked for  
9 the August linearity test prior to the  
10 last hearing?  
11 MR. PAULSSON: She didn't  
12 think that the test had not been done.  
13 MR. SUH: Oh.  
14 Q. If you thought the August  
15 linearity test had in fact been done,  
16 why didn't you look for it before the  
17 last hearing, during the discovery  
18 production?  
19 A. During the time when Mr.  
20 Landis' representatives were asking us  
21 for evidence I wasn't involved in  
22 looking for the evidence because I had  
23 to continue with my work on sample  
24 analysis.  
25 Q. I'd like to show you -- I'd

Page 884

CAS Hearing Transcript

1 CLAIRE FRELAT - DIRECT  
2 like you to read the statement right  
3 here. Did you have any discussions  
4 with anybody about the statement -- I'd  
5 like to draw your attention to this  
6 part of the discovery response right  
7 here.  
8 MR. BARNETT: Again, we face  
9 a logistical issue, of A, we're asking  
10 the fact witness to interpret a  
11 document written by the attorneys. B,  
12 she doesn't -- already said she's not  
13 comfortable reading English.  
14 Q. I can have the translator --  
15 all I'm going to ask her is if she had  
16 any part in helping her produce the  
17 document?  
18 THE PRESIDENT: Which piece  
19 do you want her to read?  
20 MR. SUH: This C 9 right  
21 here.  
22 THE INTERPRETER: May I  
23 translate?  
24 Q. Yes. Did you consult with  
25 anybody or talk to anybody about your

Page 885

CAS Hearing Transcript

1 CLAIRE FRELAT - DIRECT  
2 statement here during the -- let me  
3 rephrase the question.  
4 When the initial discovery  
5 production was going on with -- in  
6 connection with this case did you talk  
7 to anybody about your assertion here  
8 that you actually did the August  
9 linearity test?  
10 A. I was not involved in the  
11 answers given to those requests. No,  
12 they didn't ask me.  
13 MR. SUH: No further  
14 questions.

Page 886

Arnie's comment:

### ***Operator Frelat's Testimony***

Apparently, from her testimony, despite having an excellent memory at the AAA hearing, Frelat testified that:

- (a) She can't remember if she found the August linearity run alone or with Buisson.
- (b) She was looking for other linearity documents, which she found, yet continued to look for the August linearity run.
- (c) She wrote an awkward phrase in her CAS declaration ("LNDD staff found") because it was shorter than the alternative "I"—patently a false statement.
- (d) The August linearity run was not misfiled. She found it in a box labeled exactly as one would expect, a box labeled in the same way as the originally found linearity runs.
- (e) That although she was the operator who had performed the missing test, no one had ever asked her about it when it could not be found.

I do not find Frelat credible. I don't believe it.

### ***Linearity Document Fabrication Summary***

It is my judgment that the issues of (1) file and folder name and (2) Frelat's testimony are credibility issues.

The fact that (3) the folder was not on the hard drive demonstrates fraud with more certainty.

That the folder was not present on the hard drive was brought to the attention of the CAS arbitrators during Landis attorney Suh's closing arguments.

This issue was not addressed in USADA's closing, which followed, nor is it addressed in USADA's post-arbitration summary.

### ***A Comment About Responsibility***

In Frelat's testimony on this matter, and Garcia's testimony about her rebuttal declaration concerning chain of custody on page 45, I feel that the subordinate laboratory operators may have been placed into the position of lying by their supervisors and by the lab director.

The laboratory director, Jacques Ceaurriz, never testified at the AAA hearing, never submitted a declaration at the CAS hearing, and never testified at the CAS hearing. He bears the LNDD laboratory's final responsibility.

Perhaps this is what CAS arbitrator Paulsson was getting at when he questioned Frelat about responsibility. This is their exchange.<sup>35</sup>

CAS Hearing Transcript Page 916  
1       CLAIRE FRELAT - REDIRECT  
15       MR. PAULSSON: Structurally  
16       in the laboratory is it correct that  
17       you report to Ms. Mongongu?  
18       THE WITNESS: Yes.

CAS Hearing Transcript Page 917  
9       MR. PAULSSON: Does that  
10       mean that the confirmation of the  
11       positive does not end with you, it also  
12       has to be approved at her level?  
13       THE WITNESS: Yes.  
23       MR. PAULSSON: Does your  
24       controller, does your controller have  
25       to be controlled by anybody or is that

CAS Hearing Transcript Page 918  
2       the final word of the laboratory?  
3       THE WITNESS: The director  
4       also verifies the files.  
5       MR. PAULSSON: In each case  
6       as you understand?  
7       THE WITNESS: Yes. Yes, he  
8       signs the analysis reports.

<sup>35</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

## 1F. GC/MS Instrument Column Maintenance Log LNDD2005.

One of the issues in this case, as described in more detail on page 188, is the document package indicates that the laboratory used the wrong chromatography column in the GC/MS portion of the carbon isotope test for both the 'A' and the 'B' samples.<sup>36</sup>

In USADA's brief submitted before the CAS hearing, January 31, 2008, USADA's attorneys attempted to correct this problem.

USADA submitted an exhibit purporting to show the contemporaneous maintenance log of the GC/MS machine. This document purportedly showed a column change on April 2006.

LNDD

ENREGISTREMENT

Codification : E-MA-83A  
 Version : D  
 Date : 08/07/2002  
 1/1

FICHE DE SUIVI

N° d'identification : 145022

Problèmes				Interventions				Conformité
Date	Nature	Code	Type	Code	Date	Remèdes	TI	N° Remise en service
30/01/06	Trou : prise qui s'éloignait diminution de sensibilité usure de capteur élève	26	TL	26	30/01/06	Nettoyage du source (+ chgt filant n°2)	1j	5
30/01/06	Déclenchement par son 69	26	TL	26	30/01/06	Nettoyage du source	1h30	6
			PS	26	27/01/06	OGPU qu'on source chgt colonne	3j	7

Légendes : TI = Temps d'immobilisation

Types d'interventions  
 ML = Maintenance Laboratoire  
 CM = Contrôle de Maintenance  
 PS = Prestation de Service

500 COURT

Figure 13. LNDD2005. The GC/MS machine maintenance-log entries 5 and 6 are out of sequence. This error suggests that the document may have been manufactured at a later date.

However, January entries appeared out of sequence. The first entry the page is dated 30 January, 2006. The second entry, below it, is dated 20 January, 2006.

Arnie's comment:

This record cannot be what USADA and the LNDD laboratory claimed. It cannot be an accurately-maintained contemporaneous column maintenance log.

Date	
30/01/06	Trou : diminution sensibilité
20/01/06	Déclenchement

Figure 14. LNDD2005. Blowup of previous figure. Dates are out of sequence.<sup>37</sup>

<sup>36</sup> Read more about contradictory statements on this issue on page 68.

<sup>37</sup> Remember, the French record dates in the format: day/month/year.



### ***Operator Frelat Testimony Not Credible***

At the CAS hearing, Claire Frelat, the laboratory operator who attested to: (1) the document's contemporaneous nature, and (2) made the entries, was asked about the discrepancies by Landis attorney Suh.

Here is her testimony:<sup>38</sup>

CAS Hearing Transcript Page 815

1 CLAIRE FRELAT - DIRECT  
23 Q. Is this form filled out  
24 contemporaneously?  
25 A. When the instrument is put

CAS Hearing Transcript Page 816

1 CLAIRE FRELAT - DIRECT  
2 back into service, yes, the form is  
3 marked.  
4 Q. In other words, whatever is  
5 shown in the column which is third from  
6 the right, **whatever is shown in that**  
7 **column is always done contemporaneously,**  
8 **it's always filled out contemporaneously**  
9 **with what is listed there, correct?**  
10 A. **Yes.**  
11 Q. And **it's always filled out**  
12 **in order?** In other words, entry number  
13 8 would have been done before entry  
14 number 9 and entry number 9 would have  
15 been done before entry number 10,  
16 correct?  
17 A. **Yes.**  
18 Q. I'd like to now turn your  
19 attention to LNDD 2005. LNDD 2005 is  
20 what appears to be the preceding page  
21 because you can see the numbers 5, 6, 7  
22 on the far right column which precede  
23 8, 9, 10 on the page we just looked at.  
24 A. It does appear to be the  
25 previous page.

CAS Hearing Transcript

Page 817

1 CLAIRE FRELAT - DIRECT  
2 Q. And you were the operator 26  
3 who is listed in the code section which  
4 is the fifth from the right-hand side,  
5 correct?  
6 A. Yes.  
7 Q. So you would have filled out  
8 all three of those rows from the code  
9 26 to the right?  
10 A. Yes.  
11 Q. And you would have filled  
12 out the information to the left of the  
13 highlighted 26s, correct?  
14 A. Yes.  
15 Q. I'd like to turn your  
16 attention -- by the way, when was this  
17 document created?  
18 A. What do you mean by the date  
19 of creation?  
20 Q. When was the information put  
21 on this form?  
22 A. January 2006.  
23 Q. I'd like to turn your  
24 attention to the top column, excuse me,  
25 the top row and there's a date right

CAS Hearing Transcript

Page 818

1 CLAIRE FRELAT - DIRECT  
2 after the highlighted 26. Do you see  
3 how it reads January 30th of 2006?  
4 A. Yes, I see it.  
5 Q. And then go down to the row  
6 immediately below it. Do you see the  
7 date there reads January 20th, 2006?  
8 A. Yes, yes, I see it.  
9 Q. So that second -- and that  
10 third row right below that is the row  
11 containing the information relating to  
12 the change of column which is at issue  
13 in this case, you understand that?  
14 A. Yes.  
15 Q. So this form wasn't filled  
16 out contemporaneously, correct, because  
17 you couldn't have filled out the second  
18 row information after the first row's  
19 information, because it was 10 days  
20 before the information in the first

<sup>38</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

21 row, correct?  
 22 A. Apparently, yes.  
 23 Q. All right. So it is still  
 24 your testimony that this form was  
 25 filled out in January of 2006; is that

CAS Hearing Transcript

Page 819

1 CLAIRE FRELAT - DIRECT  
 2 right?  
 3 A. That's what it says on this  
 4 sheet.  
 5 Q. That's not my question. My  
 6 question is it is still your testimony,  
 7 not about what it says, but that it is  
 8 in fact a form that you filled out in  
 9 January of 2006?  
 10 A. I would prefer to say that  
 11 we see what is on the form. I don't  
 12 remember. I just can see what's  
 13 written here.  
 14 Q. Are you the LNDD technician  
 15 that changed the column in January of  
 16 2006? Excuse me, I meant April 2006.  
 17 MR. RIVKIN: Why don't you  
 18 start the question again so it's clear.  
 19 MR. SUH: Sure.  
 20 Q. Are you the technician, the  
 21 LNDD technician who changed the column  
 22 in April of 2006?  
 23 A. It's written down here that  
 24 it was me.  
 25 Q. I'm not asking what is

CAS Hearing Transcript

Page 820

1 CLAIRE FRELAT - DIRECT  
 2 written down here. I'm asking you  
 3 whether or not you remember being the  
 4 one who changed the column in April of  
 5 2006.  
 6 A. I don't remember. [Emphasis added.]

## ***USADA Attorney Young's Explanation Contradicts His Witness USADA Does Not Deny Fraud***

At the CAS hearing, Richard Young, the USADA lead attorney, was asked about the date discrepancies by arbitrator David Rivkin.

His first explanation directly contradicted the testimony of his own witness, Frelat. Frelat, the only operator to make an entry on the page in question had testified that the document was contemporaneous. Young suggested: "It wouldn't have been contemporaneous." Young may be right that the document was not contemporaneous, but then his witness's testimony is untrue.

Perhaps tellingly, Young did not deny fraud. He did ask the arbitrators not to jump to that conclusion.<sup>39</sup>

CAS Hearing Transcript

Page 1471

P R O C E E D I N G S  
 4 MR. RIVKIN:  
 6 Just what  
 7 conclusion -- what weight, if any, or  
 8 conclusion, if any, should we draw from  
 9 the fact that the rows on the column  
 10 form were out of chronological order?  
 11 MR. YOUNG: I wouldn't draw  
 12 any conclusion on it. I mean if that  
 13 happens and --  
 14 MR. RIVKIN: If it's  
 15 contemporaneous, if it's that day, how  
 16 would that happen?  
 17 MR. YOUNG: ***It wouldn't have***  
 18 ***been contemporaneous.*** You would have  
 19 filled out the two January entries at  
 20 the same time or in different order  
 21 would be my common sense understanding  
 22 of something like that. Or one of  
 23 those dates was a mistake. Those are  
 24 the two logical explanations. ***I***  
 25 ***certainly wouldn't jump from that to***

CAS Hearing Transcript

Page 1472

2 ***the conclusion that the last entry was***  
 3 ***a fraud.*** [Emphasis added.]

<sup>39</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

Arnie's comment:

It is my conclusion that the document is fraudulent.

Although USADA attorney Young specifically asked the CAS panel not to jump to the conclusion that the document was a fraud, there was no evidence presented explaining or suggesting otherwise.

Fraud is the most reasonable conclusion.

LNDD0440.<sup>40</sup>

reference-solution logs.

reference solution. This issue is discussed on page 110.

laboratory to produce its records of its preparation of these solutions

supplied

USADA0200, a record of solution preparation in the A sample, all seven of the listed solutions have concentration errors (see pages 110

of solution preparation in the B sample, not all of the reference-solution preparation documents were supplied in initial discovery.

THE NEW LAW: these documents may be:

of each solution.

See Figure 15.

26, and 41 on this page.

of three different operators: operators 15, 26, and 41 respectively

LNDB		ENREGISTREMENT		Certification : E-F-17 Version : B Date : 12/12/2005 1/1											
PREPARATION D'UNE SOLUTION DE SUBSTANCE DE REFERENCE															
Identification de la substance de référence : 3103 Nom de produit : 44 METHYL TESTOSTERONE Source : MAM															
Observation : <b>CONFIDENTIEL</b>															
Code Solu	Date Prep	Codé Op	Fournisseur	Référence N° de lot	Maçoir Volume	N° de balance	Vol. final (mL)	(C) de la solution (mg/mL)	Lieu de stockage	Solution utilisée	Date de décon-gel	Date de l'ajustage	Date mise en service	Lieu de cais-son	Date destruc-tion
046-1	13-01-2006	15	046	/	100mL	/	200	4	CHFR-1	046	13-01-2006	13-01-2006	25-01-2006	CHFR-1	16-03-2006
046-2	13-02-2006	15	046	/	100mL	/	200	4	CHFR-2	046	13-02-2006	13-02-2006	14-03-2006	CHFR-2	16-03-2006
046-3	08-03-2006	44	046	/	50mL	/	100	4	Rf12	046	08-03-2006	08-03-2006	08-03-2006	Rf12	13-06-2006
046-4	13-04-2006	44	046	/	50mL	/	100	4	CHFR-1	046	13-04-2006	13-04-2006	13-04-2006	Rf12	16-03-2006
046-5	26-04-2006	28	046	/	100mL	/	200	4	CHFR-2	046	26-04-2006	26-04-2006	02-05-2006	CHFR-2	13-06-2006
046-6	21-06-2006	44	046	/	100mL	/	200	4	CHFR-1	046	21-06-2006	21-06-2006	02-06-2006	CHFR-1	02-06-2006
046-7	26-06-2006	15	046	/	/	/	/	/	CHFR-1	046	26-06-2006	26-06-2006	26-06-2006	Rf12	22-11-2006

Cet enregistrement est à conserver dans les classeurs C-SR (substances)

**CONFIDENTIEL**

summary of the documents received in discovery, see page 335.

See Figure 16: The date<sup>41</sup> of destruction of the solutions (blue box), shown on the first two entry lines, last column, was first written as March 6, 2007. This date was then crossed out.

destructo	
06.03 2006	
06.03 2007	21.11 2006 15.11

Arnie's comment:

### ***Wrong Destruction Dates?***

When preparing reference solutions listed on the page as coming from a stock solution, the destruction dates should follow the same chronological order as the preparation dates. For an example of this, see LNDD0438. It would only make sense that later-prepared reference solutions would have later destruction dates.

### Better Record Example

N° d'identification de la substance de référence : <u>5123</u> Nom du produit : <u>4-ET-1 METHYLTESTOSTERONE</u> Solvant : _____									
Code Solution	Date	Code Op	Fournisseur	Ref. / Lot	Masse / Volume	N° d'identification de la Balance utilisée	Volume Final en ml.	Concentration de la solution en mg/ml.	Lieu de conservation
041	07/07/03	18	Sigma	44852 0350624 0350624	4,00	1	4000	4 mg/mL	Tambiente
042	07/07/03	18	Sigma	44852 0350624	4,0	1	1000	1 mg/mL	Tambiente
043	16/05/05	25	"	"	4,1	002 G	100,5	4 mg/L	Congel -7
044	08/05/05	25	"	"	4,2	002 G	512,5	8 mg/L	Congel -7
044	08/05/05	25	044	"	15 mL	—	30 mL	4 mg/L	Refig -12
1	08/05/05	25	Sigma	44852 0350624	1 mg	002 G	20 mL	4 mg/L	Congel -7
044	16/05/05	25	044	"	50 mL	—	100 mL	4 mg/L	Refig -12
046	08/05/05	25	044	"	100	002 G	250	4 mg/L	Congel -7
044	08/05/05	25	044	"	125	—	250	4 mg/mL	Congel -7
044	08/05/05	25	044	"	50 mL	—	100	4 mg/L	Refig -12
044	08/05/05	25	044	"	87 mL	—	174 mL	4 mg/L	Congel -7
046	08/05/05	25	044	"	14 mg	6	53 mL	8 mg/L	Congel -7

Arnie's comment:

This begs the question: Why?

## The Wiki Defense



### Making It Even Worse

In USADA's brief submitted before the CAS hearing, January 31, 2008, USADA's attorneys attempted to correct this problem.

They wrote: "...this document was not 'forged,' but is instead a recopied version of the original reference solution log. The original is in the possession of LNDD and contains five nonsubstantive clerical errors. A copy is produced herewith as Ex. 137, LNDD2006."

Apparently, this is still not the original, because the document contains the notation: "Copie conforme à l'original (copy conforming to the original)." That notation should have been on LNDD0440, not on this document.

Furthermore, this version is missing the first two destruction dates which were filled-in (entries in the last column, blue square) in the manufactured document shown in Figure 15 on page 42.

LNDD

ENREGISTREMENT

Codification : E-P-17

Version : B

Date : 12/12/2005

1/1

PREPARATION D'UNE SOLUTION DE SUBSTANCE DE REFERENCE

N° d'identification de la substance de référence : **SI03**

Nom du produit : **Testosterone**

Solvant : **MeOH**

Observation : **Copie conforme à l'original**

Code Solut°	Date Prép	Code Op	Fournisseur	Référence N° de lot	Masse / Volume	N° de balance	Vol. final (mL)	(C) de la solution (mg/mL)	Lieu de stockage	Solution utilisée	Date de décon-gelat°	Date de l'aliquotage	Date mise en service	Lieu de mise en service	Date destruct°
046-1	1801	15	046	—	100 mL	—	200	4 mg/L	CH.FR.1	1801	1801	1801	25.01	CH.FR.1	
046-2	2802	15	046	—	100 mL	—	200	4 mg/L	CH.FR.1	2802	2802	2802	14.03	CH.FR.1	
046-3	0803	41	046	—	50 mL	—	100	4 mg/L	Ref.12	0803	0803	0803	25.04.06	Ref.12	
046-4	1304	41	046	—	50 mL	—	100	4 mg/L	—	046	1304	1304	1304	Ref.12	
046-5	26.04	26	046	—	100 mL	—	200	4 mg/L	CH.FR.1	26.04	26.04	26.04	01.05	CH.FR.1	
046-6	28.06	41	046	—	100 mL	—	200	4 mg/L	CH.FR.1	28.06	28.06	28.06	28.06	Ref.12	
046-7	26.06	15	046	—	—	—	—	4 mg/L	046	26.06	26.06	26.06	26.06	Ref.12	

Figure 18. LNDD2006. Resubmitted methyltestosterone reference-solution log. This resubmitted "original" has five entry errors (red boxes). It also contains the notation "Copie conforme à l'original" (copy conforming to the original, blue box). That notation should have been on LNDD0440, not on this document.

Observation : <b>Copie conforme à l'original</b> <i>APF</i>						
de	Solution utilisée	Date de décon-gelat°	Date de l'aliquotage	Date mise en service	Lieu de mise en service	Date destruct°
1801	046	1801	1801	25.01	CH.FR.1	
2802	046	2802	2802	14.03	CH.FR.1	
0803	046	0803	—	0803	Ref.12	25.04.06
1304	046	1304	1304	1304	Ref.12	25.04.06
26.04	046	26.04	26.04	01.05	CH.FR.1	1.06.06
28.06	046	28.06	—	28.06	Ref.12	28.06.06
26.06	046	26.06	26.06	26.06	Ref.12	26.06.06

Figure 19. LNDD2006. Blowup of previous figure.

Arnie's comment:

As Francis Bacon wrote: "The *most* corrected copies are commonly the *least* correct."

## 1H: Fraudulent Witness Declaration?

### USADA Witness, Garcia, Unaware of Her Own Statement

One of the issues in this case, as described in more detail on page 93, is the chain of custody.

Myriam Garcia, one of the laboratory operators, made a written declaration as well as a written rebuttal statement within a few weeks of the hearing. The first statement was made on March 5, 2008. The second statement was made on March 12, 2008.

The rebuttal statement was written to explain conflicting chain-of-custody documents (further described on page 52).

Garcia gave CAS testimony on March 24, 2008 via teleconference and via interpreter. For Garcia, it was the evening in France. She was at home. It was evident that Garcia had a good command of English because she often replied to questions before the interpreter finished her translation.

In the March 12, 2008 statement, Garcia was attesting to her memory of events that had occurred in July, 2006. She allegedly stated:

"I filled out LNDD1591. When I wrote down the time of removal of the 995474 A bottle from CH.FRI and the operator code of the person who did it, I made two mistakes. I wrote down 7:30a.m. instead of 7:25 a.m. and operator code 42 instead of 44."<sup>42</sup>

Garcia recalled only one statement. She was asked about this several times, and repeatedly said she recalled only the March 5 statement. She did not recall, and did not have before her, her March 12 statement, a statement made less than two weeks earlier.

Thereupon discussion took place on and off the record. Garcia heard the attorneys and the arbitrators argue about the situation.

Then USADA attorney Dan Dunn inappropriately<sup>43</sup> questioned her and led her to a tentative, and then firmer affirmation about remembering this document.

Arnie's comment:

To me, this gave the appearance that Myriam Garcia had not provided the second statement.

I do not find it credible that Garcia could attest to events that had occurred more than one-and-one-half years previously, yet could not recall that she had made a legal statement about those events less than two weeks before.

I do not believe that Garcia wrote the rebuttal statement. I believe USADA attorneys drafted it.

---

<sup>42</sup> Garcia pre-CAS hearing rebuttal declaration, English translation, p. 2. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

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<sup>43</sup> Questioning ruled inappropriate by CAS Chair Williams. CAS official arbitration transcript. p. 1267, lines 17-19. See page 47.



Here is Garcia's CAS testimony about her recall of these two documents.<sup>44</sup>

CAS Hearing Transcript Page 1240

1 MYRIAM GARCIA - DIRECT  
9 D I A N A C L A R K,  
10 called as the interpreter in this  
11 action, resumed, having been previously  
12 sworn.  
13 M Y R I A M G A R C I A,  
14 called as a witness on behalf of the  
15 Respondent, having been first duly  
16 sworn by the Arbitrator (Jan Paulsson),  
17 was examined and testified through the  
18 interpreter as follows:  
19 DIRECT EXAMINATION  
20 BY MR. DUNN:  
21 Q. Bonjour, Madam Garcia. My  
22 name is Dan Dunn. I'm one of the  
23 attorneys for USADA. I have only a  
24 couple of quick questions for you and  
25 then counsel for Mr. Landis will

CAS Hearing Transcript Page 1241

1 MYRIAM GARCIA - DIRECT  
2 examine you.  
3 A. Fine.  
4 Q. Ms. Garcia, you've submitted  
5 two statements in this proceeding,  
6 correct?  
7 A. **No, only one statement.**  
8 Q. I think the record reflects  
9 that there are two statements, one  
10 dated March 5 and one dated March 12.  
11 Do you have both of those with you, Ms.  
12 Garcia?  
13 A. Yes, **I have one statement in**  
14 **front of me.**  
15 Q. And what is the date of that  
16 statement?  
17 A. It's the 5th of March.  
18 Q. Ms. Garcia, we have a record  
19 before us that is a second declaration  
20 that you filed dated March 12th, and  
21 I'm not sure why you don't have it in  
22 front of you, but we have it here.

23 A. Okay, fine.  
24 Q. So Ms. Garcia, just so we're  
25 clear here, do you recall now that

CAS Hearing Transcript Page 1242

1 MYRIAM GARCIA - DIRECT  
2 there were two separate statements you  
3 filed, one on March 5 and another on  
4 March 12th?  
5 A. **No, I don't remember.**  
6 Q. Ms. Garcia, is the March 12  
7 statement that you have -- I'm sorry,  
8 the March 5 statement that you have in  
9 front of you, is that the truth?  
10 A. Yes, absolutely.  
11 MR. DUNN: Thank you, Ms.  
12 Garcia. No further questions for now.  
13 THE WITNESS: You're  
14 welcome.  
15 MR. SUH: May we proceed?  
16 THE PRESIDENT: Just one  
17 moment, please.  
18 (Discussion off the record.)  
19 THE PRESIDENT: Mr. Dunn, we  
20 obviously have to hear from you as to  
21 what should happen to the signed  
22 rebuttal statement, and it's probably  
23 best to deal with this now so that  
24 counsel knows what is going to happen  
25 here because Mr. Weiss at the moment is

CAS Hearing Transcript Page 1243

1 MYRIAM GARCIA - DIRECT  
2 needing only to cross examine on one  
3 statement and yet we have a curious  
4 position, we have a signed statement in  
5 the record which the witness doesn't  
6 seem to have with her.  
7 MR. PAULSSON: Or remember.  
8 THE PRESIDENT: Or recall.  
9 MR. DUNN: May I take one  
10 second to confer with my colleague?  
11 THE PRESIDENT: Yes.  
12 (Discussion off the record.)  
13 MR. DUNN: I apologize for  
14 the confusion, but we have the signed  
15 version of her March 12 and we can try

<sup>44</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

16 to fax it to her or we can try to read  
17 it to her over the phone and refresh  
18 her memory that way.  
19 MR. SUH: We would object to  
20 reading anything to her over the phone.  
21 MR. PAULSSON: I assume it's  
22 a very --  
23 THE PRESIDENT: Mr. Dunn,  
24 one preliminary question. How is it  
25 that she has received one statement

CAS Hearing Transcript

Page 1244

1 MYRIAM GARCIA - DIRECT  
2 which she's ready to speak about but  
3 not the other?  
4 MR. DUNN: That's a good  
5 question for which I do not have a good  
6 answer. My understanding is that she  
7 did have both, but apparently that did  
8 not happen. We know we have two that  
9 have been signed and submitted. I  
10 think the only practical resolution at  
11 this point would be for us to attempt  
12 to fax it to her and ask her if she  
13 recalls it and then call her back after  
14 that, but proceed now on the basis of  
15 her March 5 statement and reserve the  
16 questions on the March 12th statement  
17 until we get it in her hands.  
18 THE PRESIDENT: Another way,  
19 and we'll have to hear Mr. Weiss on  
20 this, is to take the statement that she  
21 doesn't recall, the rebuttal statement,  
22 and read it to her and ask her whether  
23 she recalls that. If she says that she  
24 doesn't recall that, then that may be  
25 the end of the game. [Emphasis added.]

After some delay, here is how Garcia then testified after hearing attorney and arbitrator discussion, and then being improperly questioned by USADA attorney Dunn. Not reflected in the transcript, Garcia now sounded as if she was crying.<sup>45</sup>

CAS Hearing Transcript

Page 1246

6 MR. DUNN: Again, my  
7 apologies. Ms. Garcia, we have in front  
8 of us your March 12 statement in French  
9 in addition to your March 5 statement in  
10 French. Mr. Paulsson is going to read  
11 you parts of your second declaration to  
12 see if you can refresh your recollection.  
13 MR. SUH: We'd object to the  
14 characterization of the second statement  
15 as hers until there's sufficient --  
16 MR. PAULSSON: Let me do it.  
17 THE PRESIDENT: **It was**  
18 **inappropriate, Mr. Dunn, to phrase it**  
19 **that way.** But we'll proceed.  
20 MR. PAULSSON: Madam Garcia,  
21 I'm going to explain to you what we're  
22 going to do. We have in front of us  
23 the text of a document which bears a  
24 signature which does appear to be  
25 yours.

CAS Hearing Transcript

Page 1247

1 MYRIAM GARCIA - DIRECT  
2 THE WITNESS: Okay.  
3 MR. PAULSSON: The declaration  
4 that we have in front of us, I'm asking  
5 you if you have in front of you the first  
6 declaration dated March 5th.  
7 THE WITNESS: Yes, I have  
8 it. I don't have the other one, I'm  
9 really sorry, I think I should have had  
10 it but I don't have it. I'm sorry.  
11 MR. PAULSSON: This is not a  
12 criticism, this is just to clarify  
13 where things stand. The second text  
14 that I have in front of me appears to  
15 be **quotations from a statement made by**

<sup>45</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

16 **Dr. Goldberger. Does this remind you**  
17 **of anything** that you made a second  
18 statement that refuted some statements  
19 made by Dr. Goldberger?  
20 THE WITNESS: **I would have**  
21 **to read it in order to know whether I**  
22 **recall it.**  
23 MR. PAULSSON: The text that  
24 we have in front of us starts with a  
25 quotation in English. This is Dr.

CAS Hearing Transcript

Page 1248

1 MYRIAM GARCIA - DIRECT  
2 Goldberger's statement. Do you agree  
3 with that?  
4 THE WITNESS: Yes, I see.  
5 MR. PAULSSON: She just noted  
6 what I said. Following that we have what  
7 appears to be the text of the declaration  
8 itself, of the statement itself,  
9 supposedly your words.  
10 THE WITNESS: Yes.  
11 MR. PAULSSON: In rebuttal  
12 -- excuse me, I'm just reading the text  
13 which has already been translated. So  
14 maybe it doesn't need to be translated.  
15 MR. SUH: It doesn't need to  
16 be.  
17 MR. PAULSSON: Now that you  
18 hear it does this remind you of anything?  
19 THE WITNESS: Yes, that's  
20 what I wrote.  
21 MR. PAULSSON: Is this still  
22 reminding you of anything?  
23 THE WITNESS: Yes, absolutely.  
24 MR. PAULSSON: Now, do you  
25 remember having signed a statement to

CAS Hearing Transcript

Page 1249

1 MYRIAM GARCIA - DIRECT  
2 that effect?  
3 THE WITNESS: Yes.  
4 MR. PAULSSON: Thank you. [Emphasis added.]

## Summary

Arnie's comment:

USADA presented Garcia to strengthen deficiencies in the chain of custody. Garcia was to remember and testify about the transfer of Landis's 'A' sample bottle early in its handling at the LNDD laboratory.

LNDD has tested roughly 15,000 samples since Landis's 'A' sample. The bottle in question was anonymous. It was number-coded. It was not a particularly special sample bottle in any way.

It is not credible that Garcia could have recalled the handling of this particular sample bottle.

I do not believe that Garcia wrote the document rebutting the declaration of Landis witness Goldberger two weeks before the CAS hearing.

I can imagine USADA preparing chain-of-custody statements for the LNDD laboratory operators to sign. I can imagine that Garcia may or may not been asked to sign a statement prepared for her. If so, she should have read it. If so, she should have immediately recalled it on questioning at the CAS hearing.

USADA attorneys should have prepared their witness for testimony. USADA should have assured that Garcia had all relevant documents in front of her.

Shame on USADA for placing this LNDD operator in such a position.

## 11: USADA-Expert Matthews Told “Facts” Not in Evidence

Experts should come to their own opinions based on documentation or interviews/testimony of laboratory personal.

Science experts should not form opinions based on the assertions of attorneys or clients in the case, especially when such attorneys or clients have no documented basis for their statements.

One of Landis’s contentions is that USADA’s experts have lined up with varying opinions based on a changing, coordinated legal strategy, rather than the facts.

One example of this concerns whether or not the internal standard is used as a quality control measure. Read more about this on page 201.

Although USADA originally wrote and USADA’s expert Brenna originally testified that the internal standard *was* used as quality control in terms of its isotopic value, that story changed when Landis showed that the internal standard failed in such use.

At the CAS arbitration, USADA expert Dwight Matthews submitted in his pre-hearing declaration that the internal standard *was not* used as an isotopic control.<sup>46</sup>

***When asked at the CAS hearing how he knew, he stated that USADA’s science advisor, Larry Bowers, told him.***

There is no laboratory documentation as to whether or not the internal standard is or is not used for such a reason (although USADA originally stated that it was).

Matthews did not confirm this information with anyone at the laboratory.

It is improper for Matthews to base his conclusion on the statements of USADA or its attorneys. Experts should form their own conclusions based on the evidence.

For more on Matthews’s CAS testimony, see page 396.

Here is Matthews, testifying at the CAS hearing that USADA advised him about the use of the internal standard as a quality control:<sup>47</sup>

CAS Hearing Transcript

Page 1102

17 Q. And what did you look at or  
18 how did you come to conclude that the  
19 5-alpha androstanol is not used to  
20 determine accuracy in the sample run?  
21 A. Through conversation with  
22 Larry Bowers, in asking him about that  
23 particular criteria, and then asking  
24 him for data for where that came from.  
25 I don't have anything in my pocket, but

CAS Hearing Transcript

Page 1103

1 DWIGHT E. MATTHEWS - CROSS  
2 it comes from Larry Bowers.  
3 Q. So Larry Bowers, that's the  
4 gentleman seated to your right there?  
5 A. Correct.  
6 Q. And he's the person that  
7 told you that 5-alpha androstanol is  
8 not used as a measurement for accuracy  
9 within the samples, correct?  
10 A. As an isotopic standard  
11 within the runs outside of Mix Cal  
12 Acetate.  
13 Q. I'm sorry, your answer was  
14 more precise, yes. For the sample of  
15 runs outside of Mix Cal Acetate it is  
16 not used for accuracy, correct?  
17 A. You're again not restating  
18 what I said. As an isotopic standard,  
19 no.  
20 Q. And did Larry Bowers give  
21 you documents to support that?  
22 A. At this point I've looked at  
23 so many documents that if he referred  
24 me to a document I can't tell you which  
25 document that was.

<sup>46</sup> Matthews pre-CAS hearing declaration, p. 13.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>47</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

## \*\*\*1.3 Misdirection/Lies

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*“Everyone is entitled to their own opinions, but not their own facts.”*  
Senator Daniel Patrick Moynihan

In direct document production, including its briefs, the United States Anti-Doping Agency (USADA), the LNDD laboratory, and its witnesses made disingenuous and outright misstatements of fact. As is clear from information presented throughout this book, *all* of the statements that follow in this section are false or contradictory.

During the hearing before the AAA Panel, USADA spent considerable time trying to establish points they alleged proved an adverse analytic finding (positive drug test).

Landis showed that these points were not correct.

After Landis established that these assertions were incorrect, USADA changed its story.

USADA then argued that these very arguments it had brought up in the first place were unimportant and should be ignored.

In this section, I am not including the many conflicting statements made between experts, as conflicting statements are often part of any litigation. Although many conflicting statements were made, *including conflicting statements between USADA’s own experts*, those do not necessarily rise to the level of misdirection or lies.

Some of those conflicting statements are included in the section about their testimony beginning on page 372.

Keep in mind that for each of the issues that follow there are often two questions:

1. Is the background issue important in determining the validity of the testing?
2. Was there a false statement/contradictory statement/lie that undermines the credibility of the testing?

I am using the term *false statement* to apply to a statement shown to be untrue.

I am using the term *lie* to apply to a false statement made with the intent to deceive.

This section is about the false statements/contradictory statements/lies and therefore, the credibility of USADA, the LNDD laboratory, and its witnesses.

Whether or not each of the background issues that follow is also important in terms of the validity of the testing is referenced with each issue and discussed throughout the remainder of this book.

## 1J. USADA Denies Need for Chain of Custody Location Evidence Shows Need/Lab *Fails* to Document Location

### Background Issue

Central to analytical forensic work is a chain of custody.

As will be discussed, on multiple levels, the LNDD laboratory chain of custody is flawed.

USADA stated that the location of the sample bottle was not required as part of the chain of custody.

### The False Statement

USADA: “There is no WADA requirement to document the location of a bottle sample.”<sup>48</sup>

### Why the Statement is False

WADA Technical Document TD2003 LCOC, Laboratory Internal Chain of Custody states:

“The Laboratory Internal Chain of Custody records are maintained within the Laboratory to record the testing process and the **location** of the *Sample* during testing.”<sup>49</sup> [Emphasis added.]

### Read More About the Background Issue

Read more about the need for location documentation (for example, the need as confirmed by WADA-accredited laboratory directors), on page 93.

WADA Technical Document – TD2003LCOC			
Document Number:	TD2003LCOC	Version Number:	1.2
Written by:	WADA Project Team	Approved by:	
Date:	June 5, 2003	Effective Date:	January 1, 2004

**LABORATORY INTERNAL CHAIN OF CUSTODY**

There are two parts involved in the chain of custody for an individual *Sample*. Both components must be maintained in the Laboratory as part of its testing records. The external record is initiated at the collection site and ensures that the *Samples* and the results generated by the Laboratory can be unequivocally linked to the athlete. The Laboratory Internal Chain of Custody records are maintained within the Laboratory to record the testing process and the location of the *Sample* during testing.

**Figure 20. TD2003LCOC. Laboratory Internal Chain of Custody. It is clear. A purpose of the chain of custody is to document the *location* of the Sample.**

Arnie's comment:

This statement is clearly false.

USADA's lead attorney Richard Young wrote the AAA Pre-Trial Response Brief that contained the false statement denying the need to document the location of the sample bottle. Young is also credited as having written the WADA code.<sup>50</sup>

The relevant technical document, Laboratory Internal Chain of Custody, is a single page. It is not a complicated text. The language regarding location is clear.

I therefore do not believe that this false statement was merely an innocent legal error.

I believe that Young knows that the location of the sample bottle must be documented. His credibility was relied upon by the AAA arbitration panel. He may have acted to bolster his client's chance of winning. At what price comes one's integrity?

<sup>48</sup> USADA AAA Pre-Trial Response Brief, May 3, 2007, p.6, ¶8, footnote 8.

<sup>49</sup> WADA TD2003LCOC. Laboratory Internal Chain of Custody. (2003). [http://www.wada-ama.org/rtecontent/document/chain\\_custody\\_1\\_2.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/chain_custody_1_2.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.

<sup>50</sup> Documented, by way of example, at dailypeleton.com: <http://www.dailypeleton.com/displayarticle.asp?pk=3039>. Accessed Apr 20, 2008.

## 1K. USADA States Chain of Custody Documents Intact Evidence Shows Contradictions

### Background Issue

The 370-page document package does not contain an adequate chain of custody.

In an attempt to bolster an inadequate original record, USADA submitted supplemental chain of custody documentation shortly before the CAS hearing. These documents further cloud the issue.

Mutually exclusive/conflicting records make it impossible to determine who was in possession of the sample bottle, and at what time.

### The False Statement

In USADA's opening statement, USADA's counsel Young stated: "What you have when you go through these documents is the ability to identify every single individual who touched the bottles in order."<sup>51</sup>

CAS Hearing Transcript Page 217  
 15 What you have when you  
 16 go through these documents is the  
 17 ability to identify every single  
 18 individual who touched the bottles in  
 19 order.

### Why the Statement is False

One example: Conflicting documents about who removed the 'A' sample bottle from the refrigerator on July 21, 2006.

- LNDD1590 states that Operator 44 removed and possessed the sample bottle at 7:25AM.
- LNDD1591 states that Operator 42 removed and possessed the sample bottle at 7:30AM.


LNDD		ENREGISTREMENT		Codification : E-TE-02G Version : H Date : 10/12/2004 1/1	
Opération	Date	Heure	Identification du matériel utilisé		Parapha
Flacons pris en charge	X	7 h 25	Sans objet		
Mise tube, pH, densité, Trait. and-protease, Mise à pH, Vortex, Centrifugation	X	8 h 10	Solution de "Complete" : - Lot de "Complete" : A1037300 - Date lim util : 31.07.06 Code du tampon T1 : T1 - 023		
Microfiltration 1 <sup>re</sup> ultrafiltration 2 <sup>de</sup> ultrafiltration	X	9 h 30	Lot du dispositif de microfiltration : H5MN 12117 Lot du dispositif de 1ère ultrafiltration : L6EN 8335 Lot du dispositif de 2ème ultrafiltration : R6EN 69565 Code du tampon T2 : T2 - 052		
LNDD 1590					

Figure 21. LNDD1590. This form reports that LM, operator 44, removed the 'A' sample from the refrigerator at 7:25. This document was referenced in Laurent Martin's CAS witness statement of March 3, 2008.

LNDD		ENREGISTREMENT		Codification : E-MT-01 Version : F Date : 02/01/2006 1/1	
CAHIER DE MISE EN TUBE POUR LES ANALYSES CONVENTIONNELLES					
DATE : 21/07/06					
N°	Heure de destockage de CHFR-1 :	7 h 30	CO : 42		
1	BLU : CO : 45	Date (décongélation) :	d = 1.005	pH = 4	CO : 19
Heure de la mise en tube :		8 h 10	Nbre d'éch :		
LNDD 1591					

Figure 22. LNDD1591. This form reports that operator 42 removed the 'A' sample from the refrigerator at 7:30. This document was referenced in Myriam Garcia's CAS witness statement of March 5, 2008.

### Read More About the Background Issue

For more on this issue, see the *Chain of Custody* discussion starting on page 93.

<sup>51</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.



## 1L. USADA Denies Need for Validation Studies Evidence Shows Otherwise

### The Background Issue

In an attempt to unify testing across laboratories, WADA establishes *minimum* criteria for determining an abnormal test.

However, each laboratory, in setting the criteria it will use, must establish that its methods are scientifically sound.

In Landis, there is no documentation as to the method(s) used to identify compounds in the IRMS test. There is no documentation as to the validity of (these unknown) method(s).

USADA stated that WADA laboratories do not have to show that their criteria for a positive test are validated by scientific study.

### The False Statement

USADA: “When WADA has established positivity criteria, they [WADA laboratories] are not expected (let alone required) to conduct their own studies to validate their criteria.”<sup>52</sup>

### Why the Statement is False

1. The rules state that validation, including the criteria to identify target compounds, is required.
2. Christiane Ayotte, USADA’s own expert, testified at the AAA hearing that validation, including the valid identification of target compounds, is required.
3. USADA’s lead attorney, Richard Young, contradicting himself, had earlier argued, in a pre-AAA Hearing, that the WADA-mandated ISO-accreditation requirement certified the particular methods used by the lab.
4. Multiple other experts have repeatedly confirmed the need for validation studies.

<sup>52</sup> USADA AAA Pre-Trial Response Brief, May 3, 2007, p. 4, ¶6.

### The Rules

ISL 5.4.4.3.1:<sup>53</sup>

“The Laboratory must establish criteria for identification of a compound *at least as strict* as those stated in any relevant Technical Document.”

TD2003IDCR:<sup>54</sup>

“The laboratory must establish criteria for the identification of a compound.”

### USADA Expert Ayotte’s Statement<sup>55</sup>

AAA Hearing Transcript Page 856  
13 Q. Notwithstanding the fact that WADA  
14 went to great lengths to prepare this  
15 document -- I’m just going to set this here --  
16 you would agree that the laboratory still has to  
17 carry out validation to show that its testing  
18 can be done in accordance with what is set out  
19 on this technical document, right?  
20 A. Yes.

### USADA Attorney Young’s Self-Contradicting Statement<sup>56</sup>

Pre-AAA Hearing Transcript Page 101  
1 is always there and it’s always different, because we all  
2 do things slightly differently in the methodology and you  
3 always have slightly smaller shot groups.  
4 The next thing that happens in this process is  
5 that the international standard says that for me to be  
6 using this method, I need to get it ISO certified. And  
7 they don’t just ISO certify the lab -- ***I mean, they do ISO***  
8 ***certify the lab -- but they also ISO certify particular***  
9 ***methods that are employed by the lab.*** [Emphasis added.]

<sup>53</sup> WADA International Standard for Laboratories. 5.4.4.3.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>54</sup> WADA TD2003IDCR. 1. (2003). Identification criteria for qualitative assays incorporating chromatography and mass spectrometry. [http://www.wada-ama.org/rtecontent/document/criteria\\_1\\_2.pdf](http://www.wada-ama.org/rtecontent/document/criteria_1_2.pdf). Accessed Dec 28, 2006.

<sup>55</sup> The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>56</sup> The Pre-AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

### ***Other Experts***

Verkouteren, Hemmersbach, and other expert statements are discussed in detail on page 216.

### **Read More About the Background Issue**

For documentation of the multiple failures of this USADA statement, see the discussion about identification criteria on page 180 and the need for validation studies on page 216.

The discussion starting on page 180 includes testimony from two LNDD laboratory IRMS operators who (1) describe different methods of IRMS compound identification, (2) testify that neither method has a documented Standard Operating Procedure (SOP).

The discussion starting on page 216 includes documentation for the need for validation studies by multiple other experts.

Arnie's comment:

Considering that the LNDD laboratory has no documented method for identifying substances in its IRMS analyses, it is understandable that USADA would want to direct attention away from this crucial issue.

However, when assertions lack candor, those relying on candor have a great chance of being misled. That is wrong.

## 1M. USADA States Results Positive at All Labs Test Results Would Not Be Positive at UCLA

### Background Issue

The IRMS test purports to establish the presence of doping based on identifying and measuring breakdown products (metabolites) of testosterone.

There are four breakdown products, in two pairs, commonly analyzed.

Some labs, such as UCLA, look at just one pair, for a total of two breakdown products. Among other criteria, UCLA requires *both* breakdown products to be abnormal before it declares a sample an adverse analytic finding (positive drug test).

The LNDD laboratory looks at two pairs, for a total of four metabolites. LNDD declares an adverse analytic finding (positive drug test) if *any* of the metabolites is abnormal.

USADA stated that the test would have been a positive (adverse, evidence of drug use) at any lab.

### The False Statement

USADA: “Respondent’s sample is positive by any criteria.”<sup>57</sup>

### Why the Statement is False

1. USADA expert and long-time UCLA laboratory director Don Catlin stated that Landis’s results would have been a negative at UCLA.
2. UCLA documents their criteria. Landis’s sample was *not* an adverse finding by those documented criteria.

---

<sup>57</sup> USADA AAA Pre-Hearing Brief, April 16, 2007, p.58, heading L.  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

### *UCLA’s Catlin’s Testimony*

The one-out-of-four abnormal analytes test would not be called positive at the largest WADA-accredited laboratory in the world: UCLA.

USADA expert and long-time UCLA laboratory director Don Catlin stated:

Q. (By Mr. Suh) If you would obtain the same results, leaving aside a moment whether or not they were accurate... you would not declare these results as an adverse analytical finding when you were head of UCLA laboratory.

A. (By Dr. Don Catlin) “[T]hose criteria, if they’re applied to this case, would find it negative.”<sup>58</sup>

### *The UCLA Document*

The UCLA Olympic Laboratory criteria state:

“A positive report means that the delta values for *both* M1 and M2 are at least three standard deviation (SD) units less than the mean (average) of a group of 73 normal males, and the delta value for Pdiol is within 3SD of the mean of normal males.”<sup>59</sup> [Emphasis added.]

This document is reproduced in Figure 23.

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<sup>58</sup> AAA official arbitration transcript, p. 1220, line 18.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>59</sup> UCLA Olympic Laboratory. Client CIR Notice.1. Jun 22, 2001.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

Client CIR notice June 22, 2001

June 21, 2001

To: Clients of the UCLA Olympic Laboratory

Regarding: Carbon Isotope Ratio measurements, Update 3

This letter is to update you on our carbon isotope ratio method and to explain the wording we use in our current reports.

#### DIOL ASSAY

**Requests:** Currently when you request a CIR analysis we perform the "Diol" assay. The procedure is to request a CIR analysis by fax or email and to provide the sample number. We will check the original data on the sample and determine if the analysis is likely to be successful. If not, we will advise you that we do not believe the analysis will be successful and we may suggest an alternative approach. In order to enhance our understanding of the analysis we also ask that you give us all sample numbers of prior samples from the same athlete that were analyzed at UCLA.

The "Diol" assay determines the carbon isotope ratio (delta value) of two diol metabolites of testosterone which we refer to as M1 and M2, and one metabolite of a testosterone precursor (Pdiol). [See the metabolic map attached.] The assay determines the ratio of  $^{13}\text{C}/^{12}\text{C}$  for each of these three steroids. The units are usually called "delta units". In addition to the delta values for these steroids, two other types of measurements are calculated. The first is the ratio of the metabolites to the precursor. Two ratios are calculated: M1/Pdiol and M2/Pdiol. The second is the difference between the metabolites and the Pdiol: M1 Pdiol and M2-Pdiol.

**Endogenous reference compound:** The Pdiol serves as an endogenous reference compound (ERC). Since it is a metabolite of a precursor (see map) in the testosterone metabolic scheme, its delta value does not change when testosterone is administered. In the typical positive case, the delta values of M1 and M2 are low and the delta value of Pdiol is within the normal range. In negative cases, all three diols have similar delta values. The reporting terminology will be: Positive, Negative, or Indeterminate.

A POSITIVE report means that the delta values for both M1 and M2 are at least three standard deviation (SD) units less than the mean (average) of a group of 73 normal males, and the delta value for Pdiol is within 3 SD of the mean of normal males. In addition the two ratios (M1/Pdiol and M2/Pdiol) and the two differences (M1-Pdiol and M2-Pdiol) are more than 3 SD from the range of normal values. These criteria are very conservative because all must be met for the sample to be declared positive.

Figure 23. UCLA Client CIR notice.<sup>60</sup> UCLA requires both breakdown products of a pair to be abnormal in order to label an analysis adverse (doping positive). Landis's sample would not have been declared an adverse analytical finding at UCLA.

Arnie's comment:

The USADA statement is simply not true.

The issue as to whether Landis's sample would have been declared to be adverse (shown evidence of drug use) is important and discussed elsewhere in this book, for example, starting on page 211 and page 287.

That issue, substantial as it is, is a different issue than the false statements, discussed here, *about* the issue.

### Read More About the Background Issue

For more documentation of the failure of this USADA statement and the issue of metabolite positivity criteria, see page 211 and Catlin's AAA testimony on page 383.

<sup>60</sup> UCLA Olympic Laboratory. Client CIR Notice.1. Jun 22, 2001.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

## 1N. USADA States All Controls Were Accurate Evidence Shows Otherwise

### Background Issue

In an attempt to buttress its case, USADA stated that all the instrument performance checks showed that the laboratory machines were working properly.

We checked. They were not.

### The False Statement

USADA: "...LNDD's results for Respondent's A and B samples must have been accurate because all of the controls run at the same time can be proven to be accurate."<sup>61</sup>

USADA: "Because the IRMS instrument was accurate in measuring all of the controls, the results for Respondent's samples, which were analyzed by the IRMS instrument at the same time, must be accurate."<sup>62</sup>

### Why the Statement is False

Throughout testing, the LNDD laboratory failed to meet its own testing requirements.

For example, in testing the known control substance (the internal standard 5-alpha-androstanol AC) that it adds to every sample, the lab could not measure this substance within its own accuracy criteria.

	Calibration Mix	Blu (Negative Control)	995474 (Landis)
Acceptable Range	-29.96 to -30.96		
'A' Sample Failure	-30.29		-31.64 (USADA0161)
'B' Sample Failure	-30.25	-31.54 (USADA0346)	
In Range?	Yes	No	No
Pass/Failure	Pass	Lab Failure	Lab Failure

Table 1. Summary of accuracy in measuring values of 5-alpha androstanol AC reference standard in 'A' and 'B' samples.

### Read More About the Background Issue

For documentation of the multiple failures of this USADA statement, see pages 197, 201, and 206; *Negative Control Positive* on pages 223 and 231; and *QC Negative Fails* on page 260.

Arnie's comment:

The background issue concern: If the laboratory cannot accurately measure its own, known, internal reference standard, how can it measure an unknown substance?

<sup>61</sup> USADA AAA Pre-Trial Response Brief, May 3, 2007, p. 2, ¶4.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>62</sup> USADA AAA Pre-Trial Response Brief, May 3, 2007, p. 21, ¶27.

## 10. USADA/Lab Denies Manual Corrections or SOP Evidence Shows Manual Methods Routine/SOP

### The Background Issue

Early on, Landis was concerned that the LNDD laboratory was using outdated software and that it was routinely using manual, as opposed to automated, methods in its post-acquisition analysis.

After acquiring raw data, modern software automatically selects (1) peak start and stop points and (2) accounts for background noise and distortions.

In discovery, Landis repeatedly requested information about this issue.

LNDD, through USADA, repeatedly denied that:

1. Manual methods were used to correct the data.
2. That it had a procedure for such manual methods.

### The False Statements

#### False Statement #1

“Interrogatory 6: Please confirm that no post acquisition corrections of the data have been performed by LNDD in relation to sample 995474 other than those shown in the laboratory documentation package.”<sup>63</sup>

LNDD response: Confirmed.”<sup>64</sup>

#### False Statement #2

“Interrogatory 8: Please explain, with mathematical formulas, how LNDD performed and applied background subtraction to sample 995474 and related controls.”<sup>65</sup>

“Request to Produce: C10. All documents that relate to the creation and accuracy of the background subtraction method used by LNDD in the IRMS test.”<sup>66</sup>

LNDD response: Background subtraction is embedded in the instrument software, which is proprietary to the instrument manufacturer. LNDD has no separate documentation.”<sup>67</sup>

### Why the Statements Are False

1. Manual methods are used.

Landis observers saw that laboratory technicians routinely used manual methods.

At both the AAA and CAS hearings, the laboratory operators testified that they routinely used manual methods.

2. The laboratory has a documented procedure for such methods:

Standard Operating Procedure (SOP: M-DP-31, LNDD0603 to LNDD0609) for manual correction of peak starts and stops, as well as background subtraction.

At the CAS hearing, laboratory operator Claire Frelat testified that she routinely used manual methods, “like a reflex,” even on peaks where isotopic value was of no significance.”<sup>68</sup>

CAS Hearing Transcript

Page 864

```
1          CLAIRE FRELAT - DIRECT
20         Q.    Now, earlier you testified
21         that you also manually integrate the
22         internal standard within the sample,
23         correct?
24         A.    Yes, sometimes.
```

<sup>63</sup> HLJ First Set of Interrogatories, #6.

<sup>64</sup> LNDD Response to Interrogatory #6.

<sup>65</sup> HLJ First Set of Interrogatories, #8.

<sup>66</sup> GDC Second Request for Production of Documents, #C10.

<sup>67</sup> LNDD Response to Interrogatory, p. 10, #C10.

<sup>68</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

1           CLAIRE FRELAT - DIRECT  
2           Q.     Now, if the isotopic value  
3     of the internal standard does not  
4     matter because you are setting it at  
5     870 seconds, why would you manually  
6     integrate the internal standard within  
7     the sample?  
8           A.     For every peak of interest  
9     the -- for every peak of interest the  
10    internal standard is a part of that. I  
11    verify, I check the integration of the  
12    peaks.  
13          Q.     But of course if you know  
14    that the internal standard is going to  
15    elute at 870 seconds, there's no reason  
16    to manually integrate your peaks,  
17    correct? I mean if you don't care  
18    about the isotopic value of the  
19    internal standard, why would you  
20    manually integrate it?  
21          A.     **It's like a reflex.** You  
22    look to see if it's done correctly and  
23    if it's not done right then you go back  
24    to integration. [Emphasis added.]

## Read More About the Background Issue

For documentation of the multiple failures of these LNDD statements and methods, see *Results Not Reproducible* on page 206, page 208, and *Deleted Log Files* on page 255.

### Arnie's comment:

The raison d'être, the underlying mandate of Standard Operating Procedures, is that they should be developed and written so that the same or a different operator can achieve the same results.

Here, the same operators could not reproduce their original results.

That issue, critically important, is a different issue than the false statements *about* the issue.



## 1P. USADA/Lab *Denies* Need to Consider Uncertainty Evidence Shows Requirement

### The Background Issue

Critical to any analytical test are the parameters used to define an abnormal, or positive test.

Further, as no test is perfect, all tests will be subject to some error, also known as measurement uncertainty.

In the ‘B’ sample analysis, the LNDD laboratory erroneously called one of Landis’s four testosterone metabolites abnormal. It made this error because it failed to consider the uncertainty of any test result (the laboratory’s own measure of uncertainty).

USADA then tried to finesse the issue, claiming that the lab *does* consider uncertainty, though it *need* not.

### The False Statements

#### False Statement #1

From the document package:

LNDD: Reports andro – 11keto of –3.51‰ as positive.<sup>69</sup>

#### False Statement #2

Before the AAA hearing:

“Under the ISL and the applicable technical documents, LNDD’s statement in its conclusion was correct because LNDD was not required to take into account uncertainty in the measurement of its IRMS delta values.”<sup>70</sup>

#### False Statement #3

At the CAS hearing:

“[T]he lab applies uncertainty before they call it a positive.”<sup>71</sup>

<sup>69</sup> USADA0352, ‘B’ sample results.

<sup>70</sup> USADA AAA Pre-Hearing Brief, April 16, 2007, p.55, ¶91.

<sup>71</sup> CAS official arbitration transcript. p. 188, lines 15-17. The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

### Why the Statements Are False

USADA stated that LNDD did not need to take into account uncertainty.

The need to consider measurement uncertainty is documented in the laboratory’s own Standard Operating Procedure (SOP E-SEUIL-01, LNDD0617).

The lab failed to take into account uncertainty when it reported the andro – 11keto of –3.51‰ as positive.

Codification : E-SEUIL-01 Version : F Date : 22/03/2006 7 / 9		LNDD0618
e - Déclaration des résultats		
+/- 20%) IRMS : +/- 0,8‰	<div style="border: 2px solid red; padding: 5px;">IRMS : si <math>\Delta\delta &gt; -3.0</math> : résultat dans les normes si <math>-3.8 \leq \Delta\delta \leq -3.0</math> : résultat inclassable si <math>\Delta\delta &lt; -3.8</math> : résultat hors normes Préciser en nb le rapport 1/E estimé ainsi que les</div>	

Figure 24. LNDD’s own SOP requires a delta value of 3.8‰ in order to call a value above normal.

### Read More About the Background Issue

For documentation of the failure of the LNDD laboratory to consider measurement uncertainty, see page *Measurement Error* on page 233.

Read about the contradictory testimony of USADA’s own expert Brenna testimony on page 376.

## 1Q. USADA Denies Time Gaps

### Evidence Shows Multiple Time Gaps

#### The Background Issue

In Landis, although USADA initially vouched for the proper automated sequencing of autoinjection and analysis typical of most labs, this was found not to be the case.

Laboratory operators often interrupted sequencing, manually reprocessed data multiple times, and overwrote (erased) data.

#### The False Statement

USADA stated that machine accuracy was ascertained immediately before and after Landis's samples:

"...the Mix Cal Acetate, Blank Urine, and Mix Cal IRMS controls run in the same sequence minutes before, during and minutes after Respondent's sample produced the expected analytical results."<sup>72</sup>

#### Why the Statement is False

There are time gaps in both the 'A' sample and 'B' sample analysis.

It takes about 15 minutes to process a "Mix Cal Acetate" run.

It takes about 45 minutes to process urine fraction (F1, F2, or F3)

By looking at the time stamps on the document pages, we were able to reconstruct the timing of the analysis.

Here follows examples of the time stamps on two document pages and tables of the time gaps in the 'A' and 'B' sample analyses.

Data Processing Results			
Data File Name	:	DATA 013	
Folder	:	230706	
Sample Name	:	178/07 995474 F2/400ul inj 1ul	
Sample ID	:		
Sample Position	:	8	
Injection Size	:	0.0000	
Sample Type	:	Sam	
Method	:	M-AN-41	
Batch Name	:		
RunTime User	:	micromass	
Acquisition Time	:	15:25:49	Date : 23/07/06
Current Time	:	16:10:31	Date : 23/07/06

Figure 25. USADA0166. Landis's 'A' sample F2 aliquot was the penultimate IRMS sample run. This sample was acquired at 3:25 PM on July 23, 2006.

Data Processing Results			
Data File Name	:	DATA 014	
Folder	:	230706	
Sample Name	:	Mix Cal Acetate 001A-2	
Sample ID	:		
Sample Position	:	2	
Injection Size	:	0.0000	
Sample Type	:	Sam	
Method	:	M-AN-41	
Batch Name	:	230706	
RunTime User	:	micromass	
Acquisition Time	:	20:39:04	Date : 23/07/06
Current Time	:	14:24:44	Date : 24/07/06

Figure 26. USADA0183. The Mix Cal Acetate aliquot was the last IRMS sample run. This sample was acquired at 8:39 PM on July 23, 2006. A 5-hour, 14-fourteen minute gap is unexplained.

<sup>72</sup> USADA AAA Pre-Trial Response Brief, May 3, 2007, p.21, ¶27 (and USADA AAA Pre-Hearing Brief, April 16, 2007, p.37, ¶79).

The time gaps in the ‘A’ and ‘B’ samples:

	Aliquot	Start	Time Gap	Bates Stamp
1	Stabilite 1	Unknown		Not found
2	Stabilite 2	Unknown		Not found
3	Stabilite 3	9:50 AM		USADA0177
4	Mix Cal IRMS 003-1	10:01 AM	11 minutes	USADA0178
5	Mix Cal IRMS 003-2	10:17 AM	16 minutes	USADA0179
6	Mix Cal IRMS 003-3	10:33 AM	16 minutes	USADA0180
7	Mix Cal Acetate 001A-1	10:53 AM	20 minutes	USADA0181
8	Blu 1 pool 4 F3	11:40 AM	47 minutes	USADA0169
9	178/07 995474 F3	12:24 PM	44 minutes	USADA0172
10	Blu 1 pool 4 F1	1:11 PM	47 minutes	USADA0157
11	178/07 995474 F1	1:56 PM	45 minutes	USADA0160
12	Blu 1 pool 4 F2	2:41 PM	45 minutes	USADA0163
13	178/07 995474 F2	3:25 PM	44 minutes	USADA0166
14	Mix Cal Acetate 001A-2	8:39 PM	5 hours, 14 minutes	USADA0183
	Overall batch report	9:23 PM		USADA0155

**Table 2. Time gaps in IRMS acquisition of ‘A’ sample vials. There is a significant unexplained time gap after the running of last Landis’s ‘A’ sample aliquot on July 23, 2006. Contrary to USADA’s brief, an unexplained time gap puts accuracy at issue.**

Arnie’s comment:

I suspect the laboratory ran and reran the F2 fraction in the ‘A’ sample (line 13 in Table 9) and the mix cal acetate in the ‘B’ sample (line 9 in Table 10) until it achieved a “satisfactory” result.

A US President resigned, in part, after being undone by 18-1/2 minutes of unexplained time gaps.<sup>73</sup>

<sup>73</sup> Nixon. Watergate. [http://en.wikipedia.org/wiki/Watergate\\_tapes](http://en.wikipedia.org/wiki/Watergate_tapes). Accessed April 12, 2008.

	Aliquot		Time Gap	Bates Stamp
1	Stabilite 1			
2	Stabilite 2			
3	Stabilite 3			
4	Stabilite 4			
5	Stabilite 5	11:08 AM		USADA0356
6	Mix Cal IRMS 003-1	11:30 AM	22 minutes	USADA0357
7	Mix Cal IRMS 003-2	11:46 AM	16 minutes	USADA0358
8	Mix Cal IRMS 003-3	12:02 PM	16 minutes	USADA0359
9	Mix Cal Acetate 001A-1	12:24 PM	12 minutes	USADA0360
10	Blu 1 pool 4 F3	5:03 PM	4 hours, 39 minutes	USADA0347
11	178/07 995474 F3	5:48 PM	45 minutes	USADA0350
12	Blu 1 pool 4 F1	6:33 PM	45 minutes	USADA0335
13	178/07 995474 F1	7:18 PM	39 minutes	USADA0338
14	Blu 1 pool 4 F2	8:02 PM	44 minutes	USADA0341
15	178/07 995474 F2	8:47 PM	45 minutes	USADA0344
16	Mix Cal Acetate 001A-2	9:32 PM	45 minutes	USADA0362
17	Overall batch report	10:17 PM	45 minutes	USADa0331

**Table 3. Time gaps in IRMS acquisition of ‘B’ sample vials. There is a significant unexplained time gap before the running of the blank (control) F3 urine fraction in the ‘B’ sample on August 4, 2006. Contrary to USADA’s brief, an unexplained time gap puts accuracy at issue.**

## Read More About the Background Issue

For documentation of the multiple failures of this USADA statement, see *Unexplained Time Gaps* on page 123 and *Time Gaps* on page 249.

## 1R. USADA *Denies* Illegitimate Deletion of Data Evidence Shows Undocumented Deletion of Data

### The Background Issue

The rules prohibit the deletion of data. This issue is discussed in more detail on page 255.

### The False Statement

USADA, in its CAS post-hearing brief stated: “Ms. Frelat explained the entirely legitimate circumstances why certain controls were re-injected and their previous files overwritten and that no file containing complete data for any control was overwritten.”<sup>74</sup>

### Why the Statement is False

At the AAA hearing, Mongongu testified that data was deleted, that there was no record of that deleted data, and that there was no record of why that data was deleted. Frelat presumes it was because the data was “incorrect.”<sup>75</sup>

AAA Hearing Transcript

Page 589

8                   And of course, when the cal mix  
9     acetate was rerun and saved to the same file  
10    name, the first file -- the data of the first  
11    file is deleted and no longer part of the  
12    record, correct?  
13                A.    Yes.  
14                Q.    And why did you run mix cal acetate  
15    again here?  
16                A.    Because the first mix cal acetate  
17    was undoubtedly not correct.  
18                Q.    And did you take any contemporaneous  
19    notes of the first mix cal acetate being not  
20    correct?  
21                A.    No.

22                   Q.    So the record of the first mix cal  
23    acetate that was not correct no longer exists,  
24    right?  
25                A.    No.

AAA Hearing Transcript

590

1                   Q.    And you remember that the first mix  
2    cal acetate was not correct from your memory  
3    alone, right?  
4                A.    If I did a second mix cal acetate,  
5    it's because -- it was because the first one was  
6    not correct.

### Read More About the Background Issue

Deletion of data is against the rules.

Read more about data deletion on page 255.

<sup>74</sup> USADA AAA Post-Hearing Brief, p.16

<sup>75</sup> The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

## 1S. USADA/Lab States Operating Pressure Okay Green Light Fraud

### The Background Issue

In attempting to refute one of Landis's arguments, namely that the IRMS machine was used outside of its recommended operating pressure range, USADA concocted a fictitious story about the instrument's ON/OFF indicator light.

### The False Statement

USADA, in its AAA pre-hearing brief, stated: <sup>76</sup>

106. The instrument has a built-in operating light which establishes that the instrument is operating within the correct pressure range. When the instrument is operating properly a green light is displayed on the instrument. ***If the operating pressure becomes too high, the light turns yellow*** as a warning followed by red and instrument shutdown. Exhibit 32 is three color photographs of the LNDD IsoPrime instrument operating at a pressure of 5E-6mBar with the green light displayed. [Emphasis added.]

### Why the Statement is False

1. There is no mention of this light, on the thermomolecular pump controller, turning yellow in the IsoPrime user manual. (The laboratory did not have a copy of the manual.) <sup>77</sup>

The *only* reference to "yellow," as a warning, in the entire 324-page IsoPrime user manual, is on page 24. Here "yellow" refers to a bar-colored warning on the computer-monitor display.

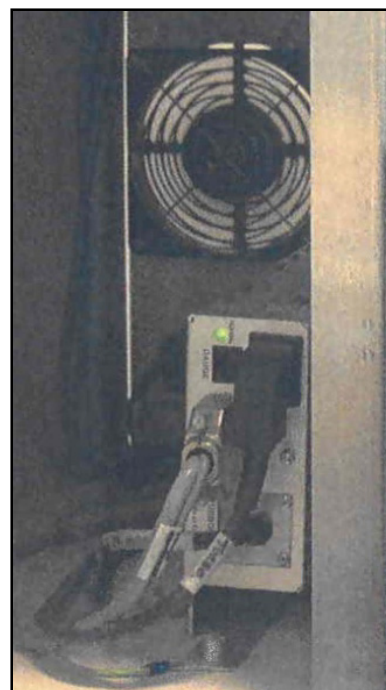


Figure 27. USADA Exhibit 32. The "green light" is in the center of the image.

2. Landis IRMS machine-expert Davis testified that the light in question is an ON/OFF indicator light. It cannot, and does not, turn yellow.

### Read More about the Background Issue

For more documentation of the failure of this USADA statement, see *Pressures* on page 225 and Davis testimony on page 360.

<sup>76</sup> USADA AAA Pre-Hearing Brief, April 16, 2007, p. 62, ¶106, ¶USADA Exhibit 32.

<sup>77</sup> The laboratory had no copy of the IsoPrime user manual (see page 224). We found one easily. Linked at: <http://arniebakercycling.com/books/wiki.htm>

## 1T. USADA States Accreditation a New CAS Issue Accreditation Raised at AAA Hearing

### The Background Issue

The issue of whether the LNDD laboratory was accredited to run the IRMS test is an important burden of proof issue.

To buttress their arguments, USADA brought in new evidence shortly before the CAS hearing.

When asked by the Panel during his opening statement why Mr. LeGuy was making a statement to this issue, as a USADA witness, just a week before the hearing, USADA attorney Young stated that they only realized with Goldberger's pre-CAS hearing declaration that there was an issue; that this issue had never been raised before.

### The False Statement

Young said USADA was "shocked" and "scrambled to talk to COFRAC," the auditing agency.<sup>78</sup>

CAS Hearing Transcript

Page 189

6 MR. RIVKIN: Mr. Young,  
7 could I ask a question of this  
8 statement by Robin Leguy. It appears  
9 to have just been signed last week.  
10 He's not -- I'm trying to figure out  
11 what the evidentiary nature of this  
12 document is. It's -- is he being  
13 presented as a witness here?  
14 MR. YOUNG: Yes. Let me  
15 tell you the background on this. **The**  
16 **first time** in all of the hundreds and  
17 hundreds and hundreds of pages of  
18 documents submitted by Mr. Landis that  
19 they ever **claimed that this method,**  
20 **EC-31, was not accredited, was** in the  
21 **witness statement of Dr. Goldberger.**  
22 And so in response to that, we got that  
23 at midnight on a Friday night, not  
24 knowing whether this panel would let  
25 that evidence in or not, we scrambled

<sup>78</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

CAS Hearing Transcript

Page 190

1 P R O C E E D I N G S  
2 to talk to COFRAC. We didn't know this  
3 was an issue. Frankly, we're **shocked**  
4 that this is an issue. We **scrambled to**  
5 **talk to COFRAC** to talk to the guy who's  
6 in charge of the accreditation to get  
7 this statement from him and that is the  
8 nature of this statement.  
9 MR. SUH: Mr. Chair, I would  
10 turn the panel's attention to the cross  
11 examination of Christiane Ayotte. We  
12 cross examined Ms. Ayotte on the issue  
13 of the 20 percent which is why we have  
14 a December cleanup document. It is not  
15 true that there has been -- this is the  
16 first time accreditation has been an  
17 issue and there's a record of it. [Emphasis added.]

### Why the Statement is False

The accreditation issue *had* been raised at the AAA hearing.

Landis attorney Suh had raised the accreditation issue in his cross-examination of USADA expert Ayotte. Reproduced below, the contradiction/mistake in the May 2006 and the December 2006 accreditation documents was noted.<sup>79</sup>

AAA Hearing Transcript

Page 878

7 Q. And in this entry, it says that the  
8 measurement of error is 20 percent for a  
9 GC/G-IRMS.  
10 A. On that paper, but I think I've seen  
11 elsewhere that it has been corrected by COFRAC.  
12 Q. It was corrected by COFRAC after the  
13 testing in this case was done, correct?  
14 A. Yeah, but that doesn't change that  
15 this is a mistake.

### Read More about the Background Issue

For further discussion of this issue, see page 87.

<sup>79</sup> The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.



## 1U. USADA States Identification Method in IRMS Method Fails → USADA Changes Story

### The Background Issue

USADA failed to ever provide the LNDD laboratory's Standard Operating Procedure (SOP) for the identification of testosterone metabolites in the IRMS test.

USADA failed to ever provide the LNDD laboratory's validation of its method to identify testosterone metabolites in IRMS.

In response to our request for the identification method used to identify substances in the IRMS test, USADA and LNDD responded inadequately. They provided scans from the GC-MS portion of the IRMS test. They never provided the SOP.

USADA attorney Richard Young, at a pre-hearing conference, stated that the method was to identify the compounds in the GC-MS portion of the IRMS test and link them to the IRMS test.

Under questioning from Landis attorney Maurice Suh at the AAA hearing, USADA witness Thomas Brenna elaborated: identification was assured by comparing the matching retention times in the GC/MS and GC-C/IRMS portions of the IRMS test.

Here are the three statements USADA/LNDD made about this issue and the testimony of their expert witness Thomas Brenna:

### The Contradictory Statements

#### *Retention Time Identification Needed*

##### Contradictory Statement #1

In discovery, Landis requested: "All DOCUMENTS that relate to the identification of each of the peaks in the IRMS analysis for any sample tested by LNDD from Floyd Landis during the 2006 Tour de France."<sup>80</sup>

<sup>80</sup> GDC Second Request for Production of Documents, January 22, 2007, p. 7, #13.

USADA and LNDD replied: "LNDD is providing full GC-MS scans for each of the six peaks used in the IRMS analysis of the A and B sample, as well as for the standards."<sup>81</sup>

##### Contradictory Statement #2

In AAA pre-arbitration discussion, USADA attorney Richard Young explained how the testosterone metabolites were identified in the IRMS test.<sup>82</sup>

Pre-AAA Hearing Transcript Page 101  
21 The way you identify the substance is using GC/MS  
22 link to the IRMA (sic).

##### Contradictory Statement #3

USADA: "The first element of compound identification is the GC 'retention time (RT)' and the second one is the molecular fingerprint recorded by the MS, which fragments the molecule into ions. Compound identification is achieved by matching GC retention times and MS ion patterns (ion ratios) between the compound in the sample and a reference standard."<sup>83</sup>

##### Contradictory Statement #4

At AAA hearing, USADA's expert Brenna first testified for the retention time identification:<sup>84</sup>

AAA Hearing Transcript Page 255  
16 Q. And how would I know which is which,  
17 because they just have numbers at the top.  
18 A. Well, they have retention times that  
19 match on the previous -- with the previous  
20 GC/MS, and the GC/MS delivers structural  
21 information, like aliquots and so forth, that  
22 tell us which is which.

<sup>81</sup> LNDD Response to Interrogatory, February 7, 2007, p. 10, #13.

<sup>82</sup> The Pre-AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>83</sup> USADA's AAA Pre-Hearing Brief, April 16, 2007, p. 19, ¶41.

<sup>84</sup> The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.



## Why the Statements Are Contradictory

Under cross-examination at the AAA hearing, Landis attorney Suh showed Brenna that the retention time method described (retention times comparison between GC/MS and GC-C/IRMS) failed.

Brenna and USADA's experts then not only abandoned this method of compound identification, they reversed themselves.

USADA's experts then testified that LNDD did not, indeed, could not use retention time to identify substances.

### *Retention Time Identification Not Needed*

#### Contradictory Statement #1: Brenna

From USADA expert Brenna's pre-CAS hearing declaration:<sup>85</sup>

"The retention times, and relative retention times, for GC/MS and GC/C-IRMS would not, and should not, be identical when two different instruments are used for analyses."

#### Contradictory Statement #2: Brenna

Here is USADA's expert Brenna now testifying at the CAS hearing *against* the retention time identification. He now *changes* his identification theory to peak pattern matching:<sup>86</sup>

AAA Hearing Transcript	Page 1971
6	A. You can't use relative retention
7	times.
14	A. Well, on the GC/MS side, we see a
15	pattern, so we can see peak heights. And so --
16	and we want to look at the overall pattern is
17	what -- an intermediate-sized peak; a small
18	peak; this is one of the strong peaks; and then
19	a large one. And then we move over a bit, and
20	we find a large peak, an intermediate peak, a
21	smaller peak. And then we move to the end, and
22	we see a large peak.

<sup>85</sup> Brenna pre-CAS hearing declaration, p. 9.

<sup>86</sup> The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

## Contradictory Statements #3 and #4

In the discovery responses, USADA and LNDD referenced mix cal acetate and blank urine solely as quality control measures.<sup>87</sup>

Nowhere in discovery responses did USADA or LNDD state that LNDD identified testosterone metabolites using: (1) peak matching or peak pattern matching, (2) mix cal acetate, or (3) blank urine.

At the CAS hearing, when the GC-MS retention time method failed, USADA's experts then testified that (1) peak matching or peak pattern matching, (2) mix cal acetate comparisons, or (3) blank urine comparisons *were* the methods used.

Mongongu and Frelat described *different* versions of this peak-matching and blank-urine method, both noting that *there is no SOP* for their procedures. Their transcript is reproduced starting on page 79 and referenced below.<sup>88</sup>

Arnie's comment:

Either USADA provided false information or its experts were testifying falsely.

Regardless, USADA and its experts failed to identify any scientifically valid method to identify substances.

## Read More about the Background Issue

For documentation of the multiple failures of this USADA statement, and the failure of the LNDD laboratory to identify substances in the IRMS test, see pages 180, 183, 185, 186, 187, and 188.

<sup>87</sup> LNDD Response to Interrogatory, February 7, 2007, p. 9-10, #7-8.

<sup>88</sup> CAS official arbitration transcript. p. 660-683, 830.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

## 1V. USADA States IRMS Columns Different SOP Violation → USADA Changes Story

### The Background Issue

As you will read, a fundamental problem with the IRMS analysis as performed by LNDD is that there is no documented identification Standard Operating Procedure (SOP) for the testosterone metabolites by the LNDD lab.

(There is not even a consistent undocumented method.)

An important question arose: Was critical equipment in the GC/MS and GC/C-IRMS portions of the IRMS test, the chromatography columns,<sup>89</sup> the same?

### The Contradictory Statements

#### *The Columns Were Different (Before the AAA Hearing)*

(1) USADA confirmed in interrogatories, and

(2) Mongongu confirmed at the AAA hearing that the columns used in GC-MS and GC/C-IRMS portions of the carbon isotope test were *different*.

1. Before the AAA hearing, we checked with USADA about the columns. USADA wrote:<sup>90</sup>

“All GC column types, temperature programs and flow rate details have already been provided in the laboratory documentation packages, on the pages list in the table below.”

LNDD RESPONSE TO OCTOBER 16, 2006 “II. INTERROGATORIES”			
1. All GC column types, temperature programs and flow rate details have already been provided in the laboratory documentation packages, on the pages listed in the table below.			
	GC column	Temperature program	Flow rate
MSD T/E screen	Page USADA 0045		
MSD T/E confirmation A sample	Page USADA 0081	Page USADA 0080	Page USADA 0080-0081
MSD T/E confirmation B sample	Page USADA 0266	Page USADA 0265	Page USADA 0265-0266
MSD for GC/MS part of IRMS test A sample	Page USADA 0124		
MSD for GC/MS part of IRMS test B sample	Page USADA 0303		
GC/C/IRMS A sample	Page USADA 0153	"Pression constante: Ajuster le SI à environ 870s" means: Constant pressure: Adjust IS at approximately 870 s.	
GC/C/IRMS B sample	Page USADA 0329	"Pression constante: Ajuster le SI à environ 870s" means: Constant pressure: Adjust IS at approximately 870 s.	

Figure 28. USADA specifically refers us to the documentation package to affirm that different columns were used in the GC/MS and GC/C-IRMS portions of the carbon isotope test of the ‘A’ and ‘B’ samples (red boxes).

Looking at the pages to which we were directed by USADA, we noted that the document package records that the columns used were *different*.

For example, in the ‘B’ sample, as shown in the screen shots below, pages USADA0303 and USADA0329 show different columns were used.

<sup>89</sup> A chromatographic column is a tube through which the sample flows. Read more about the science of chromatography starting on page 313.

<sup>90</sup> USADA’s Response to Respondent’s Second Request for Documents. Exhibit C. Page 1. February 7, 2007.

Total flow: 25.4 mL/min	
Gas saver: Off	
Gas type: Helium	
<b>COLUMN 1</b>	
Capillary Column	
Model Number: Agilent 19091s-433	
Max temperature: 325 °C	
Nominal length: 30.0 m	
Nominal diameter: 250.00 um	

USADA 0303 74

Figure 29. USADA0303. The record shows that LNDD used an Agilent 19091s-433 column in the GC/MS portion of the IRMS test.

<b>MODE OPÉRATEUR</b>		Codification : M-AN -41
		Version : B
		Date : 28/10/2005
		1 / 2
<b>PERATOIRE D'ANALYSE POUR LA CONFIRMATION DE L'ORIGINE DES METABOLITES DE LA TESTOSTERONE PAR CPG/C/SMRI</b>		
<b>COLONNE</b>		
Type:	DB17-MS JW Scien 122.4732	
Longueur:	30m	
Diamètre interne:	0.25mm	
ASSURANCE QUALITÉ		

USADA 0329 100

Figure 30. USADA0329. The record shows that LNDD used a DB17-MS column in the GC-C/IRMS portion of the IRMS test. Although the nominal length and diameter of this column is the same as the Agilent 19091s-433 column, the internal coating material is significantly different. Read more about this background issue on page 188.

- In testimony at the AAA hearing, Mongongu confirmed that the entries on the instrument control parameters pages that she performed on the 'A' sample and verified Frelat performed on the 'B' sample were the methods and procedures they followed.<sup>91</sup>

AAA Hearing Transcript Page 441

20 Q. Could you look at Page 0124.

21 A. 0124.

22 Q. Are you there?

23 A. Yes.

24 Q. Is that the procedure for the GC

25 method you followed?

AAA Hearing Transcript Page 442

1 A. Yes, that is the method of analysis.

2 Q. And you followed that in conducting

3 your work here.

4 A. Yes.

5 Q. And Mrs. Frelat followed it in doing

6 the B Sample?

7 A. Yes.

8 Q. And the standard operating procedure

9 you followed in performing the third step of the

10 IRMS analysis, what pages are those?

11 A. 0153.

12 Q. Page 153?

13 A. Yes.

14 Q. Okay. And that's the procedure that

15 you followed for the IRMS analysis?

16 A. Yes.

Again, these two statements, by USADA and Mongongu, directed Landis to look at the document package, the record, to determine the columns used. They were *different*.

<sup>91</sup> The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

## Why the Statements Are Contradictory

### *The Columns Were the Same (Before the CAS Hearing)*

After the AAA hearing, before the CAS hearing, USADA then denied its original statements that the columns were different.

### **“B. LNDD Used the Same Column Type in the GC/MS and GC/C/IRMS Instruments**

As part of his effort to attempt to explain the difference between retention times in the two instruments, Appellant raised for the first time in his appeal brief the argument that LNDD appeared to have used a different type of column in the GC/MS instrument than in the GC/C/IRMS instrument. Appellant further claims that this is a violation of the ISL because LNDD’s standard operating procedures require that the same column (the DB17ms column) be used in both instruments. Appellant’s Br. at 40. This argument fails because LNDD did in fact use the same column—the DB17ms—in each of the two instruments.”<sup>92</sup>

#### **B. LNDD Used the Same Column Type in the GC/MS and GC/C/IRMS Instruments**

As part of his effort to attempt to explain the difference between retention times in the two instruments, Appellant raised for the first time in his appeal brief the argument that LNDD appeared to have used a different type of column in the GC/MS instrument than in the GC/C/IRMS instrument. Appellant further claims that this is a violation of the ISL because LNDD’s standard operating procedures require that the same column (the DB17ms column) be used in both instruments. Appellant’s Br. at 40. This argument fails because LNDD did in fact use the same column – the DB17ms – in each of the two instruments.

**Figure 31. Before the CAS hearing, USADA contradicted itself. It now stated that the columns used in the IRMS test were the same.**

<sup>92</sup> USADA CAS Response Brief, January 31, 2008, p.43.

## Why There Are False Statements

The statements are contradictory.  
At least one must be false.

## Read More About the Background Issue

For documentation of the failure of USADA’s and Mongongu’s original statements, as well as the need to use identical columns, see page 188.

Arnie’s comment:

I believe USADA changed its story because:

1. Landis showed that the use of two different columns was a violation of the LNDD laboratory’s own equipment SOP, and
2. Without the same columns, there was no documented method to confirm the identity of the compounds in the IRMS analysis.

<b>LNDD</b>	<b>MODE OPÉRATOIRE</b>	Codification : M-AN-52 Version : A Date :28/10/2005 1 / 2
<b>ANALYSE GC/MS - CONFIRMATION QUALITATIVE DES METABOLITES DE LA TESTOSTERONE ET DE SES PRECURSEURS</b>		
<b>COLONNE</b>		
Type:	DB17-MS JW Scien 122.4732	
Longueur:	30m	
Diamètre interne:	0.25mm	
Epaisseur du film:	0.25µm	
LNDD 0664		

**Figure 32. LNDD0664. The applicable SOP, M-AN-52, requires the use of a DB-17MS chromatography column.**

## 1W. USADA Denies Bad Chromatography Admits Co-Elution of Peaks Were a Problem

### The Background Issue

One of the two tests performed was the T/E ratio (testosterone to epitestosterone ratio).

When first screened in the 'A' sample Landis's T/E ratio test result was 4.9.

When the LNDD laboratory repeated the T/E test to confirm the abnormal result, the result was 10.7

In addressing the *halving* of testosterone to epitestosterone ratios (T/E ratios) in the screening versus confirmation methods, USADA asserted that this difference was due to better chromatography.

### The False Statement

USADA: "The co-eluting peak [on the screen test] was largely eliminated on the confirmation."<sup>93</sup>

USADA: "The enlarged presentations of the B sample confirmation epitestosterone and testosterone peaks, although considerable background is still visible, the confirmation chromatograms show a better (i.e., narrower) peak shape."<sup>94</sup>

### Why the Statement is False

In fact, the chromatography was still poor, and, as the AAA panel found, the LNDD laboratory failed to properly identify both testosterone and epitestosterone by minimal standards.

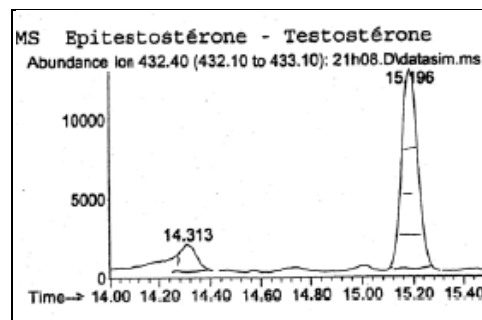


Figure 33. USADA0055. Epitestosterone is the peak at 14.313 minutes. USADA claims the chromatography was worse, here, in the screening chromatogram, than below, in the confirmation chromatogram.

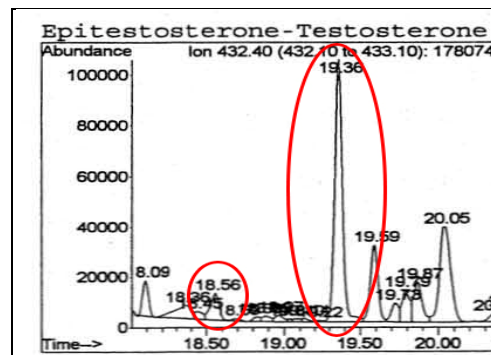


Figure 34. USADA0093. Epitestosterone is the peak at 18.56 minutes. This confirmation chromatogram is worse than the screening chromatogram above. It is considerably more crowded than the chromatogram above.

### Read More About the Background Issue

For documentation of the failure of USADA to properly identify testosterone, see *Bad Identification: Matrix Interference* on page 155.

<sup>93</sup> USADA AAA Pre-Hearing Brief, April 16, 2007, p. 76, ¶144.

<sup>94</sup> USADA AAA Pre-Trial Response Brief, May 3, 2007, p.46, ¶59.

## 1X. USADA Expert: Internal Standard as Quality Control Failure → USADA Experts Change Testimony

### The Background Issue

As you will read, a fundamental problem with the IRMS analysis is that the LNDD laboratory is shown to be unable to measure the isotopic value of a known quality control standard accurately.

USADA, in its briefs, originally stated that the internal standard was used as a quality control. For more information on this issue, see page 201.

The waffling of the experts on this issue is also discussed later. For example, see Brenna's testimony on page 379.

What is discussed below are three sets of mutually exclusive statements: at least one of each pair of statements must be false.

### The Contradictory Statements

#### ***Brenna: Didn't Know of Problem; Did Know of Problem***

In the CAS hearing, Brenna testified that he previously believed the internal standard was a quality control because he "had done a spot check on their delta values [and] ... *the ones that I looked at were fine.*"<sup>95</sup>

However, Brenna's earlier testimony at the AAA hearing shows that some of the values he had seen *were not fine*, and *he knew it*:

"I was aware that some of them were a bit outside [of their measurement of error]." <sup>96</sup>

<sup>95</sup> CAS official arbitration transcript. p. 966, line 22 to p. 967, line 3. The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>96</sup> AAA official arbitration transcript. p. 314, lines 3-4. The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

### CAS Hearing:

CAS Hearing Transcript

Page 966

10 Q. And let me ask you, when you  
11 testified that LNDD, and again, before  
12 I go on perhaps I'll draw your  
13 attention to Page 236, line 10, where  
14 you're saying they ran several sets or  
15 several levels of control, referring to  
16 the Paris lab, when you testified to  
17 that, that they were using the internal  
18 standard 5-alpha androstanol AC as a  
19 quality control that has been checked,  
20 why did you think that they were using  
21 it in that fashion?  
22 A. At that time I had done a  
23 spot check on their delta values and  
24 spot check means that I looked at some  
25 of the values and I saw that most of

CAS Hearing Transcript

Page 967

1 J. THOMAS BRENNIA - CROSS  
2 the values -- ***the ones that I looked at***  
3 ***were fine.*** And it has been pointed out  
4 that the delta values for some of the  
5 internal standards were out of the plus  
6 or minus .5, as I've said. [Emphasis added.]

### AAA Hearing:

AAA Hearing Transcript

Page 313

22 Q. When you testified earlier that the  
23 internal standards and the quality controls were  
24 very impressive, did your testimony account for  
25 the fact that the internal standards that are

AAA Hearing Transcript

Page 314

1 referenced here were outside of their  
2 measurement of error?  
3 A. Not these specific ones, but ***I was***  
4 ***aware that some of them were a bit outside,*** so  
5 the short answer is yes.



### Brenna: LNDD Don't Keep Track of Internal Standard Values

Brenna made an outright false statement to the CAS panel when he said: "[T]hey don't keep track of the isotopic ratio of their standard."

Later, he contradicted himself: "I don't understand why the numbers were recorded."

Here are the full quotes:<sup>97</sup>

CAS Hearing Transcript

Page 979

1 J. THOMAS BRENN  
2 Q. But you are not saying in  
3 this sentence that the 5-alpha  
4 androstanol shows that the instrument  
5 is working properly with respect to its  
6 ability to accurately determine  
7 isotopic values, correct?  
8 A. Correct.  
9 Q. It couldn't because there  
10 are values that are outside of the  
11 measurement of error for the determined  
12 isotopic value?  
13 A. Correct. And *they don't*  
14 *keep track of the isotope ratio of the*  
15 *standard either, .*

CAS Hearing Transcript

Page 1070

1 J. THOMAS BRENN  
2 So I don't see any harm in  
3 it. *I don't understand why the numbers*  
4 *were recorded.* I don't believe that  
5 they used those numbers as quality  
6 control for the delta values. It  
7 doesn't bother me in the least that  
8 those numbers came out poorly. And I  
9 don't believe they apply to the -- to  
10 the parts of the chromatogram that are  
11 relevant in this case.

Arnie's comment:

Of course the lab keeps track of the ratios of their isotopic standard. That is how we know they are wrong. They are documented in the 'A' and 'B' sample analyses on pages USADA185 and USADA351 respectively and in the historical data used to create Table 25 and the table in Figure 35.

We created a table of the isotopic values of the 5-alpha androstanol AC internal standard in the F3 fraction for the 27 adverse analytical findings the LNDD laboratory reported from 2004 through 2006 shown on page Table 25 on page 205.

LNDD tabled the isotopic values of the 5-apha androstanol AC internal standard in their mix cal acetate, creating the table below.

Cartographie du Mix cal Acétate 001A			
		5a Androstanol AC	Endochanolone
N°1	29-mai	-30,33	-19,76
N°2	30-mai	-30,03	-20,02
N°3	31-mai	-30,25	-19,95
N°4	1-juin	-30,28	-19,92
N°5	2-juin	-30,42	-19,80
N°6	6-juin	-29,95	-19,63
N°7	7-juin	-30,25	-19,94
N°8	8-juin	-30,27	-19,87
N°9	9-juin	-30,17	-19,85
N°10	10-juin	-30,19	-19,85
N°11	14-juin	-30,33	-19,91
N°12	15-juin	-30,15	-20,04
N°13	17-juin	-30,18	-19,93
N°14	19-juin	-30,42	-20,00
N°15	21-juin	-30,28	-19,99
N°16	22-juin	-30,34	-19,96
N°17	23-juin	-30,36	-20,14
N°18	26-juin	-30,29	-20,08
N°19	27-juin	-30,47	-19,96
N°20	29-juin	-30,38	-20,08
N°21	30-juin	-30,10	-19,99
N°22	3-juil	-30,68	-20,10
N°23	4-juil	-30,29	-19,88
N°24	5-juil	-30,36	-19,87
N°25	6-juil	-30,18	-19,81
N°26	7-juil	-30,60	-19,71
N°27	8-juil	-30,44	-19,87
N°28	11-juil	-30,26	-19,95
N°29	13-juil	-30,40	-19,97
N°30	17-juil	-30,29	-19,88
N°31	18-juil	-30,45	-20,03
N°32	19-juil	-30,22	-19,89
N°33	20-juil	-30,45	-19,83
N°34	21-juil	-30,38	-19,97
N°35	22-juil	-30,15	-19,92
N°36	23-juil	-30,29	-20,01
N°37	24-juil	-30,18	-19,95
N°38	26-juil	-30,43	-20,09
N°39	27-juil	-30,36	-20,04
N°40	28-juil	-30,40	-19,92
N°41	1-août	-30,07	-19,83
N°42	2-août	-30,28	-19,99
N°43	3-août	-30,21	-19,91
N°44	4-août	-30,40	-19,98
N°45	21-août	-30,45	-19,90
N°46	23-août	-30,26	-20,01
N°47	24-août	-30,07	-19,81

LNDD0448

Figure 36. LNDD0448. Internal standard values in the mix cal acetate as measured by LNDD from May 29, 2006 to August 24, 2006.

<sup>97</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.



### ***Brenna: Internal Standard is Impressive Quality Control to No Need to Measure***

In the AAA hearing, Brenna referred to the robustness of the LNDD laboratory's methods, including the measurement of the quality controls, incorporating the isotopic value of its internal standard, as very impressive.<sup>98</sup>

He stated that:

1. The quality controls were very impressive.
2. The purpose of adding 5-alpha-androstanol acetate is to serve as a quality control, an internal standard.
3. The purpose of this quality control is to test the instrument's ability to quantify its value.

AAA Hearing Transcript Page 302  
J. THOMAS BRENN

3 Q. And I believe at one point, you  
4 **testified** that those **quality controls were very**  
5 **impressive**, correct?  
6 A. **I believe I did.**

AAA Hearing Transcript Page 305

1 Q. All right. Maybe you could show --  
2 let me show you what is USADA 354 now. I'll  
3 zoom in right here.  
4 Before I ask you questions about  
5 it -- again, as you described, the purpose of  
6 adding **5-alpha-androstanol acetate is to serve**  
7 as kind of **a quality control, an internal**  
8 **standard**, is that right?  
9 A. Yes.  
10 Q. And in line with that quality  
11 control, I mean -- I'll say it, not as well as  
12 you would say it, but I'll say it -- that it is  
13 a -- they are solutions that **are added in order**  
14 **to test this instrument's ability to properly**  
15 **identify and quantify** what's added, fair?  
16 A. Close enough.  
17 Q. What part did I miss?  
18 A. It doesn't identify it; **it**  
19 **quantifies** it.

<sup>98</sup> The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

It was pointed out the 5-alpha-androstanol acetate values were outside of the LNDD laboratory's own quality control specification.

Brenna, at the CAS hearing, then said he did not understand why the internal standard values were recorded, that they were not being used as a quality control for quantifying their delta values.<sup>99</sup>

CAS Hearing Transcript Page 1070  
1 J. THOMAS BRENN  
2 So I don't see any harm in  
3 it. **I don't understand why the numbers**  
4 **were recorded. I don't believe that**  
5 **they used those numbers as quality**  
6 **control for the delta values.** It  
7 doesn't bother me in the least that  
8 those numbers came out poorly. And I  
9 don't believe they apply to the -- to  
10 the parts of the chromatogram that are  
11 relevant in this case.

### **Why There Are False Statements**

In each of these three pairs of mutually exclusive statements, at least one of each pair of statements must be false.

**Arnie's comment:**

We are back to where we started at the beginning of this section, with Senator Moynihan's quote. **"Everyone is entitled to their own opinions, but not their own facts."**

Brenna appears to change his facts to suit his "expert" opinion. **That is wrong.**

### **Read More about the Background Issue**

For more information about the internal standard as a quality control, see page 201 and page 379.

<sup>99</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

## 2. It Does Not Make Sense

---

Landis was tested after Stage 17 of the Tour de France, 2006. That test was allegedly positive for testosterone or its precursors.

As we will see, the testing was flawed from the beginning to the end; it was riddled with errors. Scores of laboratory and quality control standards that should have been adhered to were violated.

Moreover, even with a document package that is more science fiction than science, the results obtained did not show the presence of exogenous testosterone; the results *did not* show that Landis used testosterone or its precursors.

The following are “smell-test” arguments. These arguments are not sufficient to prove that Landis did not dope. However, they help show that “it doesn’t make sense.”

### 2A. Testosterone Level Normal, *Not* High

*Landis had a perfectly normal level of testosterone in his body.*

**USADA0101. USADA0223.**

Landis’s ‘A’-sample urinary testosterone concentration was 45.4 nanograms/milliliter (ng/mL). His ‘B’ sample testosterone concentration was 45.7 ng/mL. This is normal.<sup>100</sup>

A high value, a value that creates a suspicion of doping, is >200 ng/mL.

WADA Chairman Dick Pound: “He (Landis) has to find some way to overcome the fact that there is an ‘A’ and ‘B’ sample that is up to its eyeballs in testosterone.”<sup>101</sup>

Another quote about Pound: “Pound took something like a schoolboy’s delight in talking about Floyd’s laboratory result, which supposedly showed his testosterone level to be grotesquely above what is typical for most men. Landis has denied taking a prohibited substance and is fighting what could be a two-year ban from cycling. ‘I mean, it was 11 to 1!’ Pound said, referring to Floyd’s reported testosterone-to-epitestosterone ratio, a measure used to identify doping. ‘You’d think he’d be violating every virgin within 100 miles. How does he even get on his bicycle?’”<sup>102</sup>

Arnie’s comment:

In his comments, as WADA Chairman, Mr. Pound is inappropriate, inflammatory, and factually wrong.

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<sup>100</sup> In a sample group of men, the mean testosterone was 44.6. Geyer, H. et al. The Cologne protocol to follow up high testosterone/epitestosterone ratios. RADA (4). 109. (1996). <http://proceedings.pulse180.de/>. Accessed Mar 1, 2007.

<sup>101</sup> Dick Pound quoted. Coffey, W. *After the fall*. New York Daily News, Dec-17, 2006. [http://www.nydailynews.com/12-17-2006/sports/more\\_sports/story/480743p-404555c.html](http://www.nydailynews.com/12-17-2006/sports/more_sports/story/480743p-404555c.html). Accessed Dec 21, 2006.

<sup>102</sup> Dick Pound quoted. Sokolove, M. *The Scold*. The New York Times Magazine. Jan 7, 2007. <http://www.nytimes.com/2007/01/07/magazine/07Antidoping.t.html?ex=1325826000&en=519f8fd43e9274c7&ei=5088&partner=rssnyt&emc=rss>. Accessed Apr 21, 2007.

## **2B. Results Were Normal Before and After**

The longitudinal Tour-stage data show that Landis was tested two days before and two days after Stage 17—following Stage 15 and Stage 19.

His T/E results were negative. There was no doping.

Individuals who take testosterone may respond with a change in the T/E ratio (high-mode) or not (low-mode). However, a given individual cannot be high-mode on one occasion and low-mode on another.

As Landis expert John Amory, MD (in other cases, a USADA expert reviewer) repeatedly testified, the longitudinal results are therefore logically inconsistent and suggest laboratory error.

As discussed on page 287, the positive predicative value of the T/E test relative to the IRMS (carbon isotope) test is less than 1%.

## **2C. Urine is Concentrated**

Doping athletes, trying to avoid doping charges, may urinate immediately after the completion of an event, and then drink as much as possible to dilute their urine.

Landis did not do this. His urine was very concentrated, with a specific gravity of 1.026.

## 2D. Testosterone Does Not Work In One Day

Testosterone is the wrong drug for one-day use. It is used by athletes to build up muscle over weeks or months.

There is no scientific evidence that one-day use is of value.

### *USADA Argument*

USADA may make the argument that athletes are well-known to use testosterone patches for recovery.

Landis had a bad performance on Stage 16. USADA may argue that it makes sense to think he used a testosterone patch, in desperation, before Stage 17, and was caught.

### *Our Response*

#### Background of Gossip

Athletes should not be accused based on innuendo, or what athletes are “known” to be doing.

Much of the gossip about what athletes do or do not do is just that—gossip. In fact, some of such gossip is promulgated by WADA officials, perhaps in an effort to inflate the importance of their work or improve funding.

Example 1. Michael Sokolove, writing about WADA chair Dick Pound in the New York Times noted:<sup>103</sup>

“Take the ruckus he caused when he charged that one-third of players in the National Hockey League, or about seven per team, were using illegal performance enhancers. Sitting in his office, I asked him how he came up with that estimate. He leaned back in his chair and chuckled, completely unabashed to admit that he had just invented it. ‘It was pick a number,’ he said. ‘So it’s 20 percent. Twenty-five percent. Call me a liar.’”

Example 2. Although a T/E ratio over 4 is interpreted by WADA personnel, journalists, and the public as a presumption of doping, the

facts show a misconception. At most, 3 of 955 samples screened with T/E values between 4 and 6 in 2005 (Landis’s screened values were 4.9 and 5.1) were from athletes shown on further testing to have doped. Said differently, 952 out of 955 were not shown to have doped.<sup>104</sup>

### The Science

The bottom line is that **there are no scientific studies showing that episodic testosterone use has a beneficial effect** on human athletic performance. There are good reasons to think such use would worsen performance.

Testosterone is known as a muscle-building hormone for big-muscled strength athletes, not for aerobic endurance athletes.

Most testosterone preparations have a long half-life, although transdermal (through the skin) preparations do have a shorter half-life, perhaps hours.

In physiologic doses (doses at or below what the body naturally produces), synthetic hormones generally have little effect—the body compensates by reducing its own production.

In supraphysiologic doses (doses above what the body naturally produces), synthetic hormones stop natural production. It then takes a while for natural hormone production to get going again.

For this reason, it is reasonable to think that a testosterone patch the night before an important event would *worsen*, not improve performance.

Testosterone researcher John Amory, MD, a USADA expert, has studied episodic testosterone use, giving 10 times a physiologic dose to subjects. **Subjects were unable to distinguish between the real thing and placebo (sugar pills).**<sup>105</sup>

<sup>103</sup> Michael Sokolove. The Scold. The New York Times. January 7, 2007. <http://select.nytimes.com/gst/abstract.html?res=FA0711F63D540C748CDDA80894DF42>. Accessed Jan 7, 2007.

<sup>104</sup> Delbeke, F. Report at the Anti-Doping Convention meeting of the Advisory Group on Science, Strasbourg. July 11, 2006. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>105</sup> Telephone conference with John Amory, Maurice Suh, and the author. March 30, 2007.

## 2E. Was Something Fishy Going On?

### *Lab Accuracy. Blinding*

#### **USADA0021. USADA0228.**

Laboratory blinding to sample identification is a known important step not only in drug testing, but in all scientific work.

The Anti-Doping Rules of the UCI (paragraph 170, page 24) specifically address this.<sup>106</sup>

The recording of declared drugs allows identification of the athlete.

The limited number of samples from a given stage, and the known therapeutic use exemptions (TUEs, medications permitted by permission) of athletes make a mockery of this basic principle.

Read more about the lack of anonymity on page 143.

### *Process. Timing*

The ‘A’ sample IRMS work started *before* the T/E was confirmed.

Moreover, the screening T/E had a problem with derivatization and was known to be problematic.

Paul Scott’s comment:<sup>107</sup>

It is not “normal” to proceed to IRMS before T/E confirmation.

#### **USADA0012.**

IRMS work begun                      July 22, 11:20

1<sup>st</sup> Confirmation result              July 22, 18:02

### *Leaking of Results*

The release of results of a positive before the end of the Tour, and before the UCI knew, argues for a LNDD breach of confidentiality.

The UCI notice was made on Wednesday, July 26<sup>th</sup>, 2006.

On Tuesday, July 25<sup>th</sup>, Landis’s sample was still being processed.

Oscar Pereiro, who finished second, has stated publicly that he knew on July 25<sup>th</sup>, 2006, that Landis was a positive:

“It was the Tuesday after the Tour when I heard,” he told *Cyclingnews* at the recent Caisse d’Epargne team training camp in Mallorca. “I was not happy to hear that because at the start of the Tour, cycling was going through a lot because of *Operación Puerto*. Once the race got going people were very happy with the Tour again... the sport was incredible once more. Second in the Tour de France was incredible for me too... it was not possible two years ago for me to believe I could do something like this.”<sup>108</sup>

Denise Demir’s comment:<sup>109</sup>

Riders knew an athlete had tested positive on July 21, 2006.

Riders knew a top-10 rider was positive before the end of the Tour.

<sup>106</sup> Anti-Doping Rules of the UCI. 42. (2004).

<http://www.uci.ch/imgArchive/Rules/14ant-E.pdf>. Accessed Dec 28, 2006.

<sup>107</sup> A list of Landis’s experts and their credentials is found starting on page 357.

<sup>108</sup> Oscar Pereiro interview, cyclingnews.com. February 27, 2007.

[http://www.cyclingnews.com/riders/2007/interviews/?id=oscar\\_pereiro07](http://www.cyclingnews.com/riders/2007/interviews/?id=oscar_pereiro07).

Accessed Mar 1, 2007.

<sup>109</sup> Floyd’s Phonak team physician.

## **2F. Lab is Error-Prone**

As you will see throughout this book, the laboratory makes frequent errors in procedure, documentation, and analysis.

We have multiple reports of LNDD issuing falsely (erroneously) positive adverse analytical findings due to mixed-up sample numbers and contamination.

For details, see the *Whistleblower Documents* on page 299.

## **2G. Presumption of Guilt Wrong Approach**

In medicine, we often obtain a value that does not make sense... and as physicians, we usually think “lab error.”

In anti-doping testing, it is the opposite mindset: the value is correct and the athlete must have cheated.

However, as in medical practice, and as we have shown repeatedly in this document, laboratory errors are demonstrable.

From a good-judgment point of view, it makes sense that the positive finding was the result of laboratory error.

## 2H. Power Within Range

Landis's 2006 Tour de France Stage 17 ride was extraordinary—not so much because of his power output (fitness), as due to his commitment, superior descending skills, strategy and tactics, ability to correctly pace his effort with his PowerTap, and personal sag with fluid and energy support (he used more than 70 water bottles).

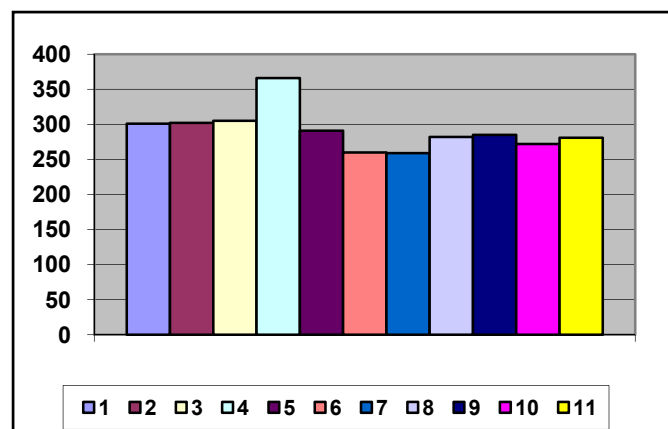
For more information, see Dr. Allen Lim's write-up at saris.com.<sup>110</sup>

Date	Average Watts	Event
3/8/05	301	Paris-Nice, 2005
3/9/05	302	Paris-Nice, 2005
3/12/05	305	Paris-Nice, 2005
5/20/05	366	Tour de Catalunya, 2005
5/21/05	291	Tour de Catalunya, 2005
7/9/05	260	Tour de France, 2005
7/10/05	259	Tour de France, 2005.
7/12/05	282	Tour de France, 2005.
7/13/05	285	Tour de France, 2005.
4/22/06	272	Tour of Georgia, 2006.
7/20/06	281	Tour de France, 2006. Stage 17.

**Table 4. Landis averaged 281 watts for the Tour de France Stage 17. On more than half a dozen other occasions, he has recorded greater average power.**

On at least half a dozen occasions for which we have racing records for 2005 and 2006, Landis averaged 280 or more watts for the duration of his ride. On these occasions, many other riders averaged higher power levels—and Landis did not win the stage.

<sup>110</sup> Lim, A. Water, Plain and Simple. August 28, 2006. Saris.com. [http://www.saris.com/athletes/PermaLink\\_guid,c6e3591a-1445-404b-a16d-bd1962ec8c2c.aspx](http://www.saris.com/athletes/PermaLink_guid,c6e3591a-1445-404b-a16d-bd1962ec8c2c.aspx). Accessed Feb 28, 2007.



**Figure 37. Landis's Tour de France Stage 17 (Yellow bar, #11) performance was similar to his performance on many other days.**

### *Doping Test and Power Value*

Power records are available for 5 days in which Landis was drug tested. These include a time trial win in the Tour of Georgia 2005, where power was contemporaneously estimated to average approximately 410 watts for 40 minutes and Landis beat Lance Armstrong by almost 2 minutes.

Test Number	Date	Event	Average Power
874535	7/17/2005	TDF 2005	249
920460	4/21/2005	Georgia	410
920462	4/22/2005	Georgia	235
951787	4/22/2006	Georgia	272
995474	7/20/2006	TDF 2006	281

**Table 5. Dates on which Landis was drug tested for which average power values are known.**



### 3. Lab Accuracy: General

Testing for doping is often difficult. Drug testing is agreed to be complicated.

Simple numerical errors and mistakes in analysis can have serious consequences.

In a 2001 review article, Christiane Ayotte, director of the WADA-accredited Canadian laboratory began: “Testing for the administration of natural steroids is a **complex** task requiring the identification and quantification of a number of parameters of the steroid profiles, one of which being the T/E value.”<sup>111</sup>

Later in the same paragraph, she wrote: “By 1997, **three** different groups had proposed the GC/C-IRMS as a promising tool for the detection of the administration of testosterone ([1] Aguilera et al., 1996; [2] Becchi et al., 1994; [3] Horning et al., 1997; [4] Shackleton et al., 1997).”<sup>112</sup>

The above paragraphs epitomize elements of this case.

Ayotte, a world-renown and respected scientist/author and her editor apparently have difficulties counting to four.

A WADA-accredited laboratory gets it wrong. The LNDD report is riddled throughout with missteps and mistakes. The laboratory makes basic as well as serious technical mistakes resulting in radically inconsistent results and unacceptable errors. The quality is appallingly poor. The LNDD analysis is flawed.

What confidence, if any, can we have that Landis’s adverse analytical finding is accurate? –None.

Wolfram Meier-Augenstein’s comment:<sup>113</sup>

To me LNDD operate and quality control (!) their work in a similar way to a person who navigates based on a faulty compass (or to be more 21<sup>st</sup> century, a faulty GPS). They are so convinced of the method by which they plot their course they completely ignore basic things such as the fact that the sun does not rise in the West no matter what the GPS says.

*The only conclusion that can be made from the document package is that the lab’s ability to perform and record sample analysis is so sloppy and error-prone as to preclude any additional conclusions.*

There is strong evidence of laboratory error and laboratory misinterpretation.

Errors are apparently inadvertent as well as deliberate.

The lab’s credibility is also under attack by others—including cycling officials, athletes, and the press.

The December 2006 Court of Arbitration for Sport<sup>114</sup> finding in Landaluce concluded that the LNDD did not follow established procedures: “An incomplete process not in accordance with all applicable legal requirements.”

The summary notes that the laboratory knew the rules; it said it was too busy to follow them.

Arnie’s comment:

This implies that the laboratory is willing to violate the rules when expedient.

<sup>111</sup> Ayotte, C. et al. GC/C-IRMS and GC/MS in “Natural” Steroid Testing. RADA (9). 133-143. 2001. <http://proceedings.pulse180.de/>. Accessed Mar 1, 2007.

<sup>112</sup> *Emphasis* added.

<sup>113</sup> A list of Landis’s experts and their credentials is found starting on page 357.

<sup>114</sup> TAS 2006/A/1119 Union Cycliste Internationale (UCI) c/ Iñigo Landaluce Intxaurraga & Real Federación Española de Ciclismo (RFEC). <http://www.tas-cas.org/fr/pdf/Landaluce.PDF>. Accessed Mar 2, 2007.

### \*\*\*3A. Lab Errors, General

Here are some things we will consider in this book:

- Is the chain of custody intact?
- Has the laboratory properly identified compounds?
- Are the instruments working properly?
- Has the laboratory followed standard analytic procedures?
- What is the lab's history of errors?
- Has the laboratory ever withdrawn an adverse analytical finding (AAF)?
- How often has a laboratory AAF been rejected by a national anti-doping agency, national arbitration, or by the Court of Arbitration for Sport?
- Are results in the 'A' and 'B' sample the same?<sup>115</sup>
- Are the results of the original analysis the same as those obtained when reanalyzed from the electronic data files?
- Was Landis's identity known to lab?

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<sup>115</sup> Carolynne Lepage's doping violation was voided due to a procedural irregularity in assuring the uniformity of 'A' and 'B' samples. <http://www.cces.ca/pdfs/CCES-CASE-LepageDecision-E.pdf#search=%22appeal%20of%20a%20doping%20infraction%20by%20Carolynne%20Lepage%22>. Accessed Aug 25, 2006.

### \*\*\*3B. Laboratory Standards

WADA laboratory standards are governed by the International Organization for Standardization, specifically ISO 17025.<sup>116</sup>

Some standards for WADA-accredited laboratories are outlined in the WADA International Standard for Laboratories.<sup>117</sup>

Other WADA documents, including technical documents, also provide guidance.

Further information about laboratory standards validation is found in the US Department of Health and Human Services document *Bioanalytical Method Validation*<sup>118</sup> and the American Academy of Forensic Sciences *Toxicology Laboratory Guidelines*.<sup>119</sup>

Arnie's comment:

At the CAS hearing, near the end of his testimony, USADA expert Dwight E. Matthews opined that the French were different.<sup>120</sup>

To me, he seemed to indicate that one difference lay in the lack of/difference in regulation of French labs.

In this regard, the French should not be different. Laboratories must uphold international standards.

CAS Hearing Transcript

Page 1157

1 DWIGHT E. MATTHEWS - REDIRECT  
6 A. I've learned a lot more  
7 about how LNDD operates. You know,  
8 **they do it differently than we do it.**  
9 **They're French, if you will.** But it's  
10 a different system. So what we call  
11 **SOPs** and we have **FDA** sitting on top of  
12 us and other kinds of regional people  
13 that watch after us, there it's  
14 different in France than here and so I  
15 got a fairly good education about how  
16 LNDD does their work. And overall I've  
17 been more impressed. It's just a  
18 difference in approach from how we may  
19 do it in the US under our **regulatory**  
20 **system.** [Emphasis added.]

CAS Hearing Transcript

Page 1165

20 MR. PAULSSON: Professor,  
21 you have no particular reason to be  
22 proud or not proud of this laboratory?  
23 THE WITNESS: No.

CAS Hearing Transcript

Page 1167

8 MR. PAULSSON: I still don't  
9 take away an understanding of the  
10 difference between the French, the way  
11 the French do it and the way you do it.  
12 THE WITNESS: There's a  
13 certain level of early -- certain  
14 documentation in the early stages of  
15 the validation are harder to find at  
16 this particular lab.  
17 MR. PAULSSON: Okay.

<sup>116</sup> International Organization for Standardization. ISO 17025. (2005).  
<http://www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=39883>.  
Accessed Dec 28, 2006.

<sup>117</sup> WADA International Standard for Laboratories. (2004).  
[http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>118</sup> U.S. Department of Health and Human Services. Bioanalytical Method Validation. May (2001). <http://www.fda.gov/cder/guidance/4252fnl.pdf>. Accessed Apr 28, 2007.

<sup>119</sup> American Academy of Forensic Sciences. Toxicology Laboratory Guidelines. (2006).  
<http://www.soft-tox.org/docs/Guidelines%202006%20Final.pdf>. Accessed Apr 28, 2007.

<sup>120</sup> CAS official arbitration transcript. p. 1157, 1165-1167.  
Linked at: <http://arniebakerecycling.com/books/wiki.htm>.

### \*\*\*3C. The Lab Puts *Garbage In*, It Gets *Garbage Out*

One requirement of accurate analysis by chromatography is the *clear separation of substances on a flat baseline*.

That such separation is achieved with basic stability, precision, and calibration measurements is *no* guarantee that *similar* clear separation of substances will occur in *real-world* sample analysis. It is *no* guarantee of analysis success.

In Landis's tests, the chromatograms that are read as abnormal have one thing in common—they are appallingly bad chromatograms—they are garbage.

For background information about GC/MS and GC/C-IRMS chromatography, see *Appendix G: Test Procedures and Problems* on page 313.

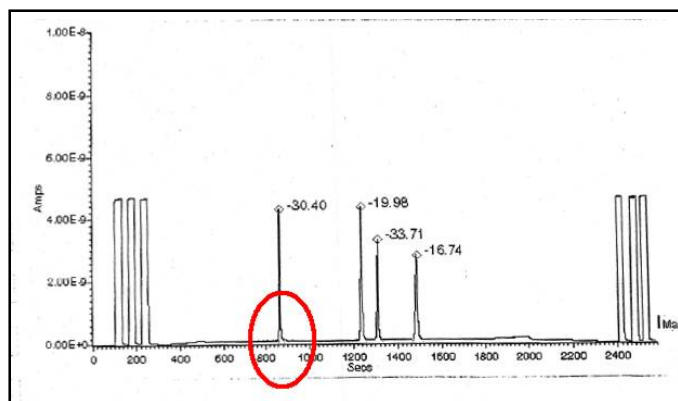


Figure 38. USADA0361. The calibration and accuracy check provided by the calibration mix acetate in the 'B' sample is a relatively trivial test. Here the chromatogram is clean, with a clearly isolated peak on a flat baseline.

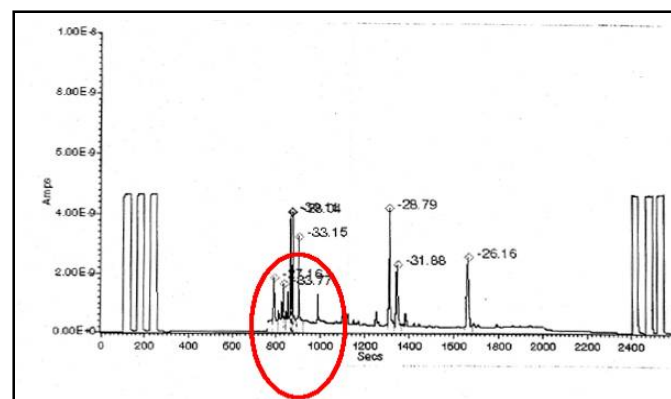


Figure 39.USADA0349. The real-world analysis of Landis's 'B' sample is *not* a test the LNDD is able to perform accurately. The sample preparation and chromatography is, in the words of USADA expert Brenna, "ugly."<sup>121</sup> Peaks are not well-separated and the baseline is not flat.

<sup>121</sup> CAS official arbitration transcript. p. 1078, line 18. The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

### **\*\*\*3D. Electronic Data Files Defective Data Doesn't Match Original Report Results Process Stinks**

*Read more about electronic data files destruction on pages 123, 126, 249, and 255.*

#### ***A Chain Only as Strong as Its Weakest Link***

Errors in anti-doping testing may occur at almost any step of the way—from the initial collection of the urine to the report's compilation.

One of the last links in the chain—after collection, storage, chemistry processing, and testing—is the computer analysis of the electronic data files.

Although these files may be garbage due to mistakes made along the way, rerunning the electronic data files through the machine's computer program should be a trivial task that yields *exactly* the same results, every time, regardless of the inherent validity of the results.

Said differently, rerunning the electronic data files should result in precisely the same results, regardless of the inherent accuracy of those results.

As you will read later, one of our early concerns was the inherent inaccuracy of the lab's old isotope ratio mass spectrometry (IRMS) machine and software. This machine is running decade-old OS-2 software. It is too old to be integrated into the lab's computer network.

Software upgrades, not used by the laboratory on this machine, have considerably improved the accuracy of processing results in one of the last links of the testing chain.

Due to many problems with the printed documentation we first received, one of our earliest discovery requests was to see these electronic data files.

Although our requests we made in September of 2006, it was only in May of 2007, barely one week before the scheduled arbitration, that we were allowed limited view of these electronic data files, under the supervision of an arbitration-panel-appointed expert.

Our observers had limited access to the laboratory during initial testing, and there was doubt as to the authenticity of the electronic files that the laboratory did provide.

The panel-appointed expert decided to take an extra step before running the files on a more modern machine and software.

He decided to run a simple test of the file's authenticity: He decided to first run the electronic data files on *the lab's own old original machine with the old original software* before running the data on a newer machine with newer software.

This should have been a trivial task, accomplished in minutes—to confirm that the reprocessed results (albeit potentially inaccurate) were exactly the same as originally generated results.

The laboratory operator who originally processed the 'A' sample results, Cynthia Mongongu, was asked to reprocess the same data.

After many hours of data processing, tries and retries, Ms. Mongongu was unable to reproduce the original 'A' sample results.

#### **Arnie's comment:**

**Either:**

- The files were not the original files.
- The machine and its software are not operating correctly.
- The analyst is incompetent.

### \*\*\*3E. Trivial Tests Do Not Guarantee Accuracy

Consider a mobile phone. You check it out at the store, a store that is located near a cell tower. The device turns on and seems to work just fine.

Then you ride on a highway under an underpass—and lose transmission, or take it to your home on a canyon—and cannot make a connection.

Working in relatively simple conditions does not mean real-world capability.

USADA and the LNDD attest<sup>122</sup> that by checking stability, precision, and calibration, “...these checks individually and together ensured that the subsequent sample measurements were accurate.”

That is simply not true.

Ensuring stability, precision, and calibration are necessary, but not sufficient steps. They do not ensure that subsequent sample measurements are accurate.

As discussed elsewhere in this document (for example, under *Bad Identification* for GC/MS testing beginning on page 152, and under *Bad Identification* for IRMS testing beginning on page 197) such simple tests are not real-world challenges.

Moreover, as you will read, throughout testing, the LNDD laboratory (1) failed to perform some of the quality control checks required by their own procedures, and (2) the quality control checks they did perform, failed.

For some examples, see page 197, page 201, page 206, *Negative Control Positive* on page 223, page 231, and *QC Negative Fails* on page 260.

### \*\*\*3F. Accreditation Testing Does Not Guarantee Ability

Generally speaking, accreditation—whether in labs, hospitals, or other facilities—means that a review of policies and procedures has taken place so that the accrediting agency believes that it has established that good results are possible.

It is a *necessary* step in quality assurance.

However, it is *not* a *sufficient* step to guarantee good results.

The *capability* of achieving good results does not necessarily translate into that reality.

In medicine, for example, a hospital accreditation process may check that the operating room has the necessary equipment to perform procedures. To this end, a checklist may affirm that anesthesia machines are present, that lighting is adequate, and that the electrical systems are up to code.

The accreditation process does not guarantee that all will go well; for example, that the surgeon will not infect a patient because he breaks sterile technique, or that a surgical sponge will not be left in the patient’s abdomen.

Clearly, ISO accreditation does not guarantee laboratory accuracy: the accreditors did not notice the *Mickey Mouse Ears* discussed on page 243.

Moreover, for the reasons discussed next, there is good reason to doubt the LNDD laboratory was accredited to run its testosterone analyses in the first place.

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<sup>122</sup> USADA Pre-hearing Brief, April 16, 2007, p. 31, ¶71.  
Linked at: <http://arniebakerrecycling.com/books/wiki.htm>.

### \*\*\*3G. Lab Not Accredited For Accurate IRMS Test

#### Certification in Effect During 'A' and 'B' Sample Analysis

The laboratory attests that ISO certification 1-1174 was in force during Landis's Stage 17 tests.<sup>123</sup>

Certification 1-1791 became effective December 15, 2006.

Certification 1-1174			
EC31	Urine	Détermination de l'origine des métabolites et présence de la testostérone par GC/MSMS CD : 8°C	Extraction SPE Détection AgO/Pyridine Analyse IRMS
EC32A	Urine	Analyse qualitative de glucocorticoïdes CD : Tr, Abondances relatives des ions caractéristiques	Extraction SPE Analyse CLIP/MS/MS
EC32B	Urine	Analyse qualitative de glucocorticoïdes CD : Tr, Abondances relatives des ions caractéristiques	Extraction SPE Analyse CLIP/MS/MS
Date de prise d'effet : 01/08/2006			

Figure 40. LNDD0086. Certification 1-1174. The measurement uncertainty for the IRMS test is certified to 20%. This certificate was in effect May 1, 2006, during Landis's sample analysis.

Certification 1-1791			
EC31	Urine	Détermination de l'origine des métabolites et présence de la testostérone par GC/MSMS CD : 8°C	Extraction SPE Détection AgO/Pyridine Analyse IRMS
EC32A	Urine	Analyse qualitative de glucocorticoïdes CD : Tr, Abondances relatives des ions caractéristiques	Extraction SPE Analyse CLIP/MS/MS
EC32B	Urine	Analyse qualitative de glucocorticoïdes CD : Tr, Abondances relatives des ions caractéristiques	Extraction SPE Analyse CLIP/MS/MS
Date de prise d'effet : 15/12/2006			

Figure 41. LNDD0098. Certification 1-1791. The measurement uncertainty for the IRMS test is certified to 0.8%. This certificate was in effect December 15, 2006, not during Landis's sample analysis.

#### Landis's Sample OK Within Certified 20% Range?

Certificate 1-1174 attests to the LNDD's measurement of uncertainty for the IRMS test. The measurement of uncertainty is listed as 20%.

All of Landis's metabolites are well within this range.

Metabolite	B Sample Crude Results	20% Uncertainty Range	Subtraction Value Range
	USADA0351		
Etiocholanolone	-23.80	-19.04 to -28.56	-11.14 to +7.1
Androsterone	-25.29	-20.23 to -30.34	-12.92 to +7.13
11 Ketoetiocholanolone	-21.78	-17.42 to -26.14	
5β-Androstanediol	-23.69	-18.95 to -28.43	-11.59 to +13.93
5α-Androstanediol	-27.43	-21.94 to -32.91	-11.86 to +3.86
5β-Pregnanediol	-21.05	-16.84 to -25.80	

Table 6. Considering the 20% uncertainty range stated in LNDD's ISO accreditation document, all of Landis's 'B' sample metabolites are normal.

<sup>123</sup> Find LNDD certification documentation on LNDD0073-0105.



### ***Procedures Not Accredited***

#### **LNDD0407 to LNDD0429.**

The LNDD accreditation from COFRAC (LNDD0382 to LNDD0432) lists the analyses that LNDD is accredited to perform.

The analysis listing is on pages from LNDD0407 to LNDD0429.

The assay used in GC/MS for T/E is EC24D.

The method is M-AN-27. This method is listed on USADA0193 and numerous other pages.

The assay for GC/C-IRMS is EC31.

The method used for the GC/MS portion of the GC/C-IRMS is M-AN-52. This method is listed on USADA0124, USADA0303, and numerous other pages.

I find nothing in the COFRAC documents to suggest accreditation for assay EC24D.

I find nothing in the COFRAC documents to suggest accreditation for method M-AN-52.

### ***Chromatography Columns Use Problematic***

The LNDD was certified to run its GC/C-IRMS testing on Agilent DB-17ms columns. It ran the GC/MS identification procedure with a DB-5ms column. Nowhere in its certification is the DB-5ms column approved for use in anabolic steroid analysis.

For more on this issue, see page 188.

### ***IRMS Analyte Identification: No SOP***

At the CAS hearing, Mongongu testified that she used peak matching and retention times between the GC/MS and GC-C-IRMS machines to make identifications. (Read more about this on page 180.

On direct questioning from Mr. Suh, Mongongu stated that there is no Standard Operating Procedure (SOP) for peak matching; there is no SOP for retention times.

At the CAS hearing, both Mongongu and Frelat testified that they used the blank urine to make identifications.

Both Mongongu and Frelat stated that there is no SOP for this method of analyte identification.

LNDD accreditation was not based on these methods.

### ***Summary***

At the time of Landis's 'A' sample and 'B' sample analysis, LNDD was accredited to run IRMS testing with *not* better than 20% accuracy.

The laboratory has not provided sufficient evidence that it was accredited to perform the T/E assay; nor has it provided sufficient evidence that it was accredited to run the GC/MS portion of the GC/C-IRMS.

LNDD was *not* certified to use the DB-5ms column in steroid analysis.

LNDD has no SOP, validation, or accreditation for its method of analyte identification in GC/C-IRMS.

**(1) Lab Operators Lie About Validation/Accreditation or  
(2) Lab Willing to Use Non-Validated/Accredited Machine**

Operators Mongongu and Frelat were both asked why they used the older IsoPrime1 machine, with its OS2 software, rather than the more modern IsoPrime2 machine.

Both testified that the IsoPrime2 machine was not validated/accredited at the time of Landis's testing in August 2006.

However, documents provided in discovery indicate that the laboratory has used the more modern IsoPrime2 machine on at least two occasions to declare an athlete's sample positive. See Figure 43 and Figure 44.

Therefore, either the operators were lying about validation, or the laboratory was willing to use an unvalidated/unaccredited machine in athlete analysis and declare a positive based on that analysis.

Here is Mongongu's testimony at the CAS hearing:<sup>124</sup>

CAS Hearing Transcript Page 756  
19 REDIRECT EXAMINATION  
20 BY MR. YOUNG:  
21 Q. Ms. Mongongu, in the  
22 laboratory today there are two  
23 instruments, the IsoPrime 1 and the  
24 IsoPrime 2; is that right?  
25 A. There are actually three.

CAS Hearing Transcript Page 757  
1 CYNTHIA MONGONGU - REDIRECT  
2 Q. We had a question earlier  
3 why it was that Mr. Landis' sample was  
4 analyzed on the IsoPrime 1 instead of  
5 the IsoPrime 2 instrument.  
6 A. In fact, at the time the  
7 analysis was done, **the IsoPrime 2 had**  
8 **not yet been validated.** Only the  
9 IsoPrime 1 had been validated, so we  
10 did analyses using that.

Here is Frelat's testimony at the CAS hearing:

CAS Hearing Transcript Page 824  
1 CLAIRE FRELAT - DIRECT  
19 Q. Are you aware that Ms.  
20 Mongongu explained to the panel that  
21 the IsoPrime 2 had not been validated  
22 at the time of the testing of Mr.  
23 Landis' sample and that only the  
24 IsoPrime 1 had been validated?  
25 A. I don't know what she said

CAS Hearing Transcript Page 825  
1 CLAIRE FRELAT - DIRECT  
2 during her testimony. I don't know  
3 what she said in her testimony, but it  
4 is quite true that **the IsoPrime 2 was**  
5 **not validated until after that date.**  
6 Q. So --  
7 MR. RIVKIN: Just so we're  
8 clear, until after what date?  
9 THE WITNESS: The dates when  
10 the analysis for Mr. Landis were done.  
11 Q. But still yet you were using  
12 the IsoPrime 2 to conduct IRMS testing  
13 on athlete's samples before July of  
14 2006, correct?  
15 A. Whenever the IsoPrime 1 was  
16 undergoing maintenance it would happen  
17 that we would use the IsoPrime 2, yes.

**Arnie's comment:**

**This reminds me of the Landaluce case, where the LNDD admitted it violated the rules when it was expedient to do so. See page 145.**

<sup>124</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

In its pre-hearing brief, USADA wrote:  
 “Between 2004 and 2006 the Laboratoire National de Dépistage du Dopage (“LNDD”) alone analyzed 362 athlete samples using IRMS, reporting 27 as positive cases.”<sup>125</sup>

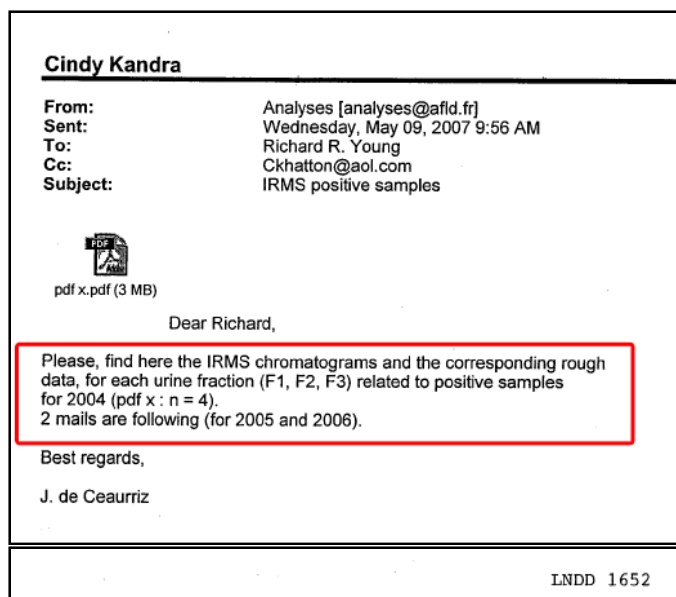


Figure 42. LNDD1652. This page documents that the pages that follow were LNDD positives from 2004 to 2006.

<sup>125</sup> USADA Pre-hearing Brief, April 16, 2007, p. 1, I. Introduction.  
 Linked at: <http://arniebakercycling.com/books/wiki.htm>.

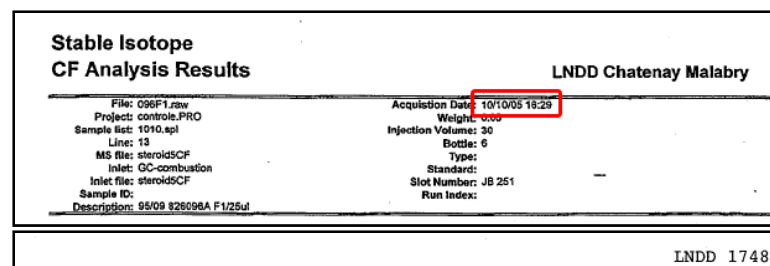


Figure 43. LNDD1748. This page documents that the Isoprime2 instrument was used to declare a positive sample on an analysis performed October 10, 2005. (The reporting format is different from the Isoprime1 machine and LNDD operators have acknowledged this form comes from the Isoprime2 instrument.) This work took place before the original Landis stage 17 ‘A’ sample analysis.

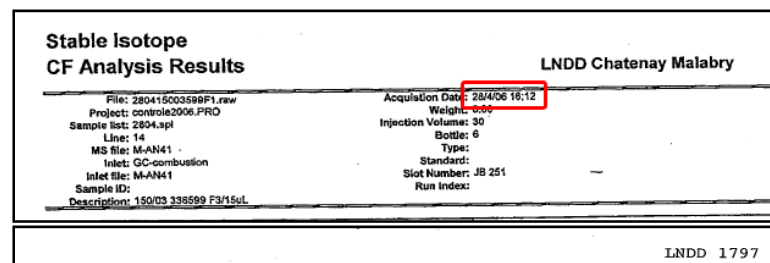


Figure 44. LNDD1797. This page documents that the Isoprime2 instrument was used to declare a positive sample on an analysis performed April 28, 2006. (The reporting format is different from the Isoprime1 machine and LNDD operators have acknowledged this form comes from the Isoprime2 instrument.) This work took place before the original Landis stage 17 ‘A’ sample analysis.

### \*3H. Proficiency Testing Does Not Guarantee Ability

As part of WADA's quality assurance program, WADA labs are periodically required to test samples that are known negatives or known positives.

However, the laboratory knows they are evaluating proficiency samples. This testing is often performed by the best laboratory analysts, on the best equipment.

Borderline samples are not used in proficiency testing.

"Near or below threshold limit ... samples... will not be considered for evaluation for the purposes of the PT [proficiency testing] program."<sup>126</sup>

Such testing is a good idea, but not sufficient to assure laboratory competence.

By way of analogy, consider that a laboratory tests weight on a scale, and divides results into two categories: Above 150 pounds is called heavy, below 150 pounds is called light. The laboratory claims an accuracy of one pound.

Now WADA sends a sample that weighs 50 pounds. Or a sample that weighs 300 pounds. It is not a real-world test. A 148-pound weight would provide more information about laboratory proficiency.

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<sup>126</sup> WADA International Standard for Laboratories, 3.2 (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

### \*3I. Inadequate Documentation

WADA rules state:

"The Laboratory must have documented procedures to ensure that it maintains a coordinated record related to each Sample analyzed. In the case of an Adverse Analytical Finding, the record must include the data necessary to support the conclusions reported (as set forth in the Technical Document, Laboratory Documentation Packages). In general, the record should be such that in the absence of the analyst, another competent analyst could evaluate what tests had been performed and interpret the data."<sup>127</sup>

For many reasons, the document package provided is inadequate. Here are a few:

- The chain of custody is inadequate. For discussion about this issue, see page 93.
- The document package shows that the columns used in the GC/MS and GC/C-IRMS portions of the carbon isotope ratio test were different, a violation of the LNDD's laboratory's Standard Operating Procedure (SOP). USADA, with supplementary documents, attempts to show that the columns must be the same and that the documentation package must be in error. Read more about this issue on page 188.
- No records of the points chosen for manual peak integration and background subtraction exist.
- No documentation exists for the use of the internal standard as an isotopic control. This issue even had USADA's expert Matthews asking for clarification. See pages 49 and 396.
- Documentation of proper peak identification is inadequate in both the T/E ratio test and the IRMS test. For discussion about peak identification in the T/E test, see page 152. For discussion about peak identification in the IRMS test, see page 180.

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<sup>127</sup> WADA Internal Standard for Laboratories, 5.2.6.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

### **\*3J. Operators Have Minimum Education/Experience**

Testimony from IRMS operators Claire Frelat and Cynthia Mongongu and supervisor Corrine Buisson show that these laboratory employees had minimal training and experience.

Supervisor Corrine Buisson had worked with the IsoPrime IRMS machine before her employment at LNDD—using a more advanced operating system. She did not train the operators—“they were already trained.”

The operators had little outside experience using the IsoPrime instrument before their employment at the LNDD.

Operator Frelat had less than six months experience as an approved analyst.

The operators testified that they had no outside training or continuing education after their arrival at LNDD.

Note: Testimony from the Montreal and UCLA WADA-approved laboratory directors Christine Ayotte and Donald Catlin indicated that as directors, they have limited knowledge of the operation of the instruments used in their facilities. Ayotte and Catlin testified that they rely on their staff to manage the analyses, and to bring to them accurate reports for their approval.

Arnie’s comment:

My impression is that the laboratory operators had an inbred knowledge of the laboratory’s procedures and the working of their instruments.

Mongongu trained Frelat. Mongongu performed the ‘A’ sample analysis. Frelat performed the ‘B’ sample analysis. Mongongu verified Frelat’s ‘B’ sample analysis; Mongongu essentially verified her own work. This presents a “same operator” conflict, discussed in more detail on page 145

Like a broken-telephone conversation, information was lost along the way. Knowledge and performance degraded, rather than improved, over time.

## 4. Lab Accuracy: Procedure

### \*\*\*4A. Chain of Custody

#### ISL Violation<sup>128</sup>

ISL 5.2.2.2:<sup>129</sup>

“The Laboratory shall have Laboratory Internal Chain of Custody procedures to maintain control of and accountability for Samples from receipt through final disposition of the Samples. The procedures must incorporate the concepts presented in the WADA Technical Document for Laboratory Internal Chain of Custody.”

TD2003LCOC:<sup>130</sup>

1. “The Laboratory Internal Chain of Custody records are maintained within the Laboratory to record the testing process and the *location* of the *Sample* during testing.”
2. “The entry into the Laboratory Internal Chain of Custody should be completed at the time that any change of possession occurs.”
3. “In the case of Samples, the Laboratory Internal Chain of Custody should record all *movement* from receipt in that Laboratory through storage and sampling to disposal.”
4. “The Laboratory Internal Chain of Custody shall be a *continuous* record of individuals in possession of the samples or Sample Aliquots.”
5. “When not in an individual’s possession, it should be documented that the Sample or Aliquot is within a controlled zone.”

<sup>128</sup> For more on the significance of ISL and other violations, see page 16.

<sup>129</sup> WADA International Standard for Laboratories. 5.2.2.2. (2004). *Emphasis* added.  
[http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>130</sup> WADA TD2003LCOC. Laboratory Internal Chain of Custody. (2003). [http://www.wada-ama.org/rtecontent/document/chain\\_custody\\_1\\_2.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/chain_custody_1_2.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.

### Chain of Custody Flawed

The chain of custody and workflow documents are incomplete, contradictory, erroneous, and unreliable.

Egregious and systematic breaks in the chain of custody in the handling of Sample 995474 in both the A and B sample bottles while at the LNDD undercuts the reliability of the LNDD’s findings and are fatal to the reliability of their test results.

### Need for Impeccable Chain of Custody

In a 1994 report to the International Amateur Athletic Federation regarding laboratory procedures, Professor Manfred Donike, the father of the anti-doping movement, stated: “The chain of custody... must be impeccable before a positive finding can lead to sanctions.”

### WADA Lab Directors Note Requirements

WADA laboratory directors and experts including Don Catlin and Manfred Donike note:<sup>131</sup>

1. An impeccable chain of custody is necessary “To ensure that the urine tested suffered no contamination, tampering, or mislabeling...”
2. “The chain of custody begins at the collection site and ends with the final report.”
3. “Each transfer must be documented, including within-laboratory transfers.”
4. “The laboratory must be able to give exact documentation on such details as where a certain sample was located at a given time and the identity of the person handling the sample at the time in question.”

<sup>131</sup> Catlin, Cowan, Donike, et al., “Testing Urine for Drugs,” International Federation of Clinical Chemistry (1992), Exhibit GDC0219-0232.  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

## LNDD's Documentation

The LNDD documents its “chain of custody” at USADA0253 through USADA0257.

The material on these pages repeats material from the ‘A’ sample found on USADA0010 through USADA0012.

Although not part of this “chain of custody” record per se, we have created a timeline, and noted selected features of workflow.

The timeline is found on page 99.

## Not a True Chain of Custody

### USADAA0253 to USADA0257. USADA0200.

LNDD's documentation at USADA0253 through USADA0257 is merely a summary sheet of aliquoting and procedures performed of sample bottles and aliquots. It is inadequate as a chain of custody document.<sup>132</sup> It was constructed *after* the analyses.

It is *not* a *contemporaneous* record.

It does not record *movement* of the sample.

These pages document custody at a *point* in time while in each operator's possession, not *continuously* during that possession.<sup>133</sup>

Inadequacy is immediately apparent. For this reason, these pages are referred to in quotation marks as a “chain of custody.”

Consider the ‘A’ sample bottle on July 22, 2006 at 11:25 AM.

22/07/2006 – 11h20	49	S. 104 (ambiant)	Mise en tube pour la confirmation IRMS
22/07/2006 – 12h45	18	CH.FR.1 (+4°C)	Stockage

Figure 45. USADA0253. Where was the ‘A’ sample bottle at 11:25 AM?

<sup>132</sup> USADA admitted as much in its AAA pre-hearing response brief, p. 16, calling it a “summary document.”

<sup>133</sup> For an example of operator testimony attesting to the inadequacy of the “chain of custody” record, see Frelat's testimony on page 389.

The document at USADA0253 shows that operator 49, Cynthia Mongongu, had the sample bottle at 11:20 AM and that she took an aliquot for IRMS testing. It shows that operator 18, Esther Cerpolini, returned the bottle to storage at 12:45 PM.

The question arises: Where exactly, and under whose custody, was the bottle at 11:25 AM? At 11:30 AM? At 11:35 AM?

In testimony, Ms. Mongongu stated that she had a clear recollection, a specific picture in her memory, that Ms. Cerpolini had possession of the bottle at 11:25 AM in order to perform specific gravity and pH testing. (See page 402 for her exact testimony.)

However, USADA0200 documents that Ms. Cerpolini performed specific gravity and pH testing at 10:50 AM.

Echantillon : 138102 991 995774		Mode opératoire d'extraction : M.F. OUB	
Date	Appareil	Température en °C	Valeur affichée
22/07/06	pHmet n° 7	99.9	5.92
22/07/06	Refract n° 2		1.025
Date de mise à l'ambiant de l'échantillon : 22/07/06		Heure de mise à l'ambiant : 9h05	
Prise d'essai PE : 2 mL		Heure de la PE : 10h50	
Donneur	Densité	Facteur de dilution	Vol. eau ajoutée (en mL)

Figure 46. USADA0200. Operator 18, Esther Cerpolini is documented as having performed the pH test (value = 5.22) and specific gravity test (value = 1.025) at 10:50 on July 22, 2006.

It therefore remains unknown where, and in whose custody, the bottle was at 11:25 AM.

During the May 2006 arbitration, Montreal Laboratory Director Christiane Ayotte said that testimony is acceptable as method of documenting chain of custody.<sup>134</sup>

<sup>134</sup> WADATD2003LCOC. Laboratory Internal Chain of Custody. (2003). [http://www.wada-ama.org/rtecontent/document/chain\\_custody\\_1\\_2.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/chain_custody_1_2.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.



#### Arnie's comment

Ayotte is correct in quoting the technical document: however, this document should be rewritten. *Testimony* as a method of documenting custody is absurd.

What happens in the event of a witness's memory failure or death? Witnesses sometimes have an astonishing (unbelievable) memory for minute details, but can often forget simple facts.

Chain of custody documents must be complete, and stand on their own without the need for testimony.

This particular problem also shows the folly in accepting WADA rules and regulations without considering worldwide laboratory practices and common sense.

Moreover, in this case, testimony is documented to be flawed.

### Failure to Record Intra-Laboratory Transfers

LNDD systematically failed to record intra-laboratory transfers of the 'A' and 'B' sample bottles and aliquots.

#### *Operator-to-Operator Transfers*

##### 'A' Sample

1. On July 21, 2006, LNDD failed to record how the 'A' sample bottle was transferred from Martin in Salle [room] 107 to Garcia in Salle 106, when the sample was transferred, and where it was transferred.
2. On July 22, 2006, LNDD failed to record how the 'A' sample bottle was transferred from Cerpolini in Salle 103 to Mongongu in Salle 104, which occurred sometime between 10:50 to 11:20, where it was transferred, and when it was transferred.
3. On July 22, 2006, LNDD failed to record how the 'A' sample bottle was transferred from Mongongu in Salle 104 to Cerpolini which occurred sometime between 11:20 and 12:45, where the transfer occurred, and when it was transferred.

##### 'B' Sample

1. On July 28, 2006, LNDD failed to record who removed the 'B' sample bottle from the freezer, and where this transfer occurred.
2. On August 3, 2006, LNDD failed to record how, where, and when the 'B' sample was removed from the freezer. In addition, LNDD failed to record the transfers of how, when, and where the B sample bottle was transferred from Cerpolini in an unknown location to Frelat in Salle 004, which occurred somewhere between 9:12 and 11:03.
3. On August 3, 2006, LNDD failed to record the transfer of the 'B' sample bottle from Frelat in Salle 004 to Barlagne in Salle 103.

LNDD's systematic failure to record intra-laboratory transfers is apparent when compared to the method of documenting intra-laboratory transfers at the UCLA and Montreal laboratories. (See Figure 47.)

Exhibit GDC0030-0031 is a chain of custody document from the Montreal laboratory. This chain of custody document establishes the time, date, and person or place who had the sample bottle; and the person or place to whom the sample bottle was given. This is in direct contrast to LNDD, which simply records information in only one-half of the intra-laboratory transfer, i.e., information about one aspect of the work the person who received the sample bottle performed, and not the person who provided the bottle.

LNDD's "chain of custody" documents are also in stark contrast to the UCLA laboratory's chain of custody documents.

Exhibit GDC0032-0033, contains two chain of custody documents from the UCLA laboratory. Similar to the Montreal laboratory, the UCLA laboratory records both parties to the intra-laboratory transfer, which, unlike LNDD, creates a continuous chain of custody.



### **Dubious Handling**

Due to the well-appreciated problem of degradation (spoilage), the sample bottle should not sit needlessly around the laboratory at room temperature. Operators should promptly return sample bottles to refrigeration.

#### **USADA0253.**

On July 21, 2006, the 'A' sample bottle was removed from the refrigerator at 7:25 AM and was not returned until 9:25 AM, two hours later. During those two hours, the only documented task completed was the creation of aliquots, which takes just a few minutes.

#### **USADA0119, USADA0120, USADA0200.**

On July 22, 2006, the 'A' sample bottle was removed from storage at 9:05 AM and not returned until 12:45 AM, over three and a half hours later. During these three and a half hours that the 'A' sample bottle was removed from storage, the operators who purportedly had possession of the 'A' bottle were conducting chemistry for both the T/E and IRMS tests.

#### **USADA0079, USADA0253, USADA0256.**

On July 23, 2006, the 'A' sample bottle was removed from the refrigerator at 2:20 PM and not returned until 5:00 PM, over two-and-a-half hours later. The aliquoting for the second confirmation T/E test, which was the only reason for removing the bottle from storage, was completed at 3:00 PM; yet, the bottle was not replaced until two hours later.

### **Sample Number Errors**

Sample number errors are present throughout the document package. Of course, if one is examining the wrong sample, the chain of custody is broken.

These are discussed in more detail on page 113. One example:

#### **USADA0024. USADA0229.**

There is a question as to whether Landis's sample/sample number is properly recorded as having been transported. It is a question of handwriting legibility: a '6' vs. a '4.'

## Other Chain of Custody Issues

### USADA0023.

The chain of custody documentation of the handoff of the samples from the doping control officer to the courier is inadequate.

### USADA0022. USADA0023.

The chain of custody documentation of the handoff of the samples from the courier to the LNDD is contradictory or uncertain. It is unclear whether Molina or Rahali received the sample.

### LNDD1590. LNDD1591.

Perhaps realizing that the document package could not stand on its own regarding chain of custody (an ISL violation as discussed on page 91), USADA submitted additional documentation on May 3, 2007, shortly before the AAA hearing.

LNDD1590 purports to indicate that on July 21, 2006, Operator 44 (Laurent Martin, LM) possessed Mr. Landis's sample bottle at 07:25. There is no indication from where Operator 44 obtained this sample.

LNDD1591, reportedly filled out by Operator 19 (Myriam Garcia) directly contradicts LNDD 1590 in two ways: (1) it states that the sample bottle was not removed from the freezer until 07:30, and (2) it states that the bottle was removed by Operator 42.

Both Laurent Martin, operator 44, and Jean Antoine Martin, operator 42, were working that day.<sup>135</sup>

Not surprisingly, almost two years later, Operator 19 has no independent recollection of what transpired that day.<sup>136</sup>

Therefore, this chain of custody contradiction cannot be resolved in favor of the laboratory.

LNDD		ENREGISTREMENT		Codification : E-TE-02G Version : H Date : 10/12/2004 1/1	
Opération	Date	Heure	Identification du matériel utilisé		Parapha
Flacons pris en charge	X	7 h 25	Sans objet		
Mise tube, pH, densité, Trait. anti-protease, Mise à pH, Vortex, Centrifugation	X	8 h 10	Solution de "Completo" : - Lot de "Completo" : A1037300 - Date fin util : 31.07.06 Code du tampon T1 : T1 - 023		
Microfiltration			Lot du dispositif de microfiltration : H5MN 12.117		
1 <sup>re</sup> ultrafiltration	X	9 h 30	Lot du dispositif de 1ère ultrafiltration : L6EN 8335		
2 <sup>de</sup> ultrafiltration			Lot du dispositif de 2ème ultrafiltration : R6EN 69565 Code du tampon T2 : T2 - 052		

LNDD 1590

Figure 48. LNDD1590. This form reports that LM, operator 44, removed the 'A' sample from the refrigerator at 7:25. This document was referenced in Laurent Martin's CAS witness statement of March 3, 2008.

LNDD		ENREGISTREMENT		Codification : E-MT-01 Version : F Date : 02/01/2006 1/1	
CAHIER DE MISE EN TUBE POUR LES ANALYSES CONVENTIONNELLES					
DATE : 21/04/06					
N°	Heure de destockage de CHF-1 :	7 h 30	CO : 42		
1	BLU : CO : 45	Date (décongélation) :	d = 1.005	pH = 4	CO : 19
	Heure de la mise en tube :	8 h 10	Nbre d'éch :		

LNDD 1591

Figure 49. LNDD1591. This form reports that operator 42 removed the 'A' sample from the refrigerator at 7:30. This document was referenced in Myriam Garcia's CAS witness statement of March 5, 2008.

<sup>135</sup> USADA0014 and CAS official arbitration transcript. p. 725, lines 8-13.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>136</sup> Garcia: CAS official arbitration transcript. p. 1251, line 9 to p.1252, line 14.

### \*\*\*4B. Timeline with Chain of Custody and Other Notes

Timeline of analysis of sample number 95474.

Testosterone and epitestosterone values are uncorrected, unless noted as “corr.” Isotope values are corrected.

	Event	Operator	Date	Time	Comments	Results	Bates
	Preliminaries to Initial Storage						
1.	Landis starts Stage 17	Landis	July 20, 2006	11:45 AM	Info from Denise Demir.		
2.	Landis finishes Stage 17	Landis	July 20, 2006	5:08 PM	Stage time: 5:23. Then ceremony and press. Info from Denise Demir.		
3.	Landis arrives at doping control	Landis	July 20, 2006	5:50 PM	UCI copy on AFLD pdf page 234.		USADA0021 USADA0228
4.	Collection	Landis	July 20, 2006	5:55 PM	SG and pH clear in UCI copy. AFLD pdf page 234.	SG pH	1.030 5.0 USADA0021 USADA0228
5.	Split A and B	Landis	July 20, 2006	5:55 PM	UCI copy on AFLD pdf page 234.		USADA0021 USADA0228
6.	Handoff to courier/transport	Chevalier, Simonetti	July 20, 2006	Unknown	USADA pre-hearing brief, 25, page 11. Air transport. <b>No documentation in document package.</b>		USADA0023 USADA0230
7.	LNDD receives 'A' and 'B' samples	Rahali (V21) Molina (02)	July 20, 2006	9:35 PM	<b>Time recorded incorrectly as 9:35 rather than 21:35 or 9:35 PM.</b> <b>Unclear who received: Molina or Rahali.</b>		USADA0024 USADA0253 USADA0023
8.	LNDD stores 'A' sample	Rahali (V21)	July 20, 2006	10:15 PM	'A' at 4°C, CH.FR.1.		USADA0013 USADA0253
9.	LNDD stores 'B' sample	Rahali (V21)	July 20, 2006	10:15 PM	'B' at -20°C, CH.FR.3.		USADA0013 USADA0253
10.	LNDD transfers 'B' sample between freezers		Unknown	Unknown	<b>Transfer operator, method, location, and time not recorded.</b>		USADA0013 USADA0253
11.	LNDD stores 'B' sample	Neveu (V08)	July 28, 2006	3:45 PM	'B' at -20°C. CH.FR.5.		USADA0019 USADA0254

...continues next page

	'A' Sample Container					
12.	Removal from refrigerator	L. Martin (44) L. Martin (44) J. A. Martin (42)	July 21, 2006 July 21, 2006 July 21, 2006	7:25 AM 7:25 AM 7:30 AM	Conflicting documents.	USADA0014 USADA0253 LNDD1590 LNDD1591
13.	Aliquoting for EPO	L. Martin (44)	July 21, 2006	8:10 AM		USADA0014 USADA0253
14.	Transfer bottle from operator 44 to 19		July 21, 2006	?:?:? AM	Transfer method, location, and time not recorded.	USADA0014 USADA0253
15.	Aliquoting for T/E screen	Garcia (19)	July 21, 2006	9:10 AM		USADA0014 USADA0253
16.	Return to refrigerator	Garcia (19)	July 21, 2006	9:25 AM	'A' at 4°C, CH.FR.1.	USADA0014 USADA0253
17.	Removal from refrigerator	Cerpolini (18)	July 22, 2006	9:05 AM		USADA0015 USADA0253
18.	Aliquoting for T/E confirmation #1	Cerpolini (18)	July 22, 2006	10:50 AM		USADA0015 USADA0253
19.	Transfer bottle from operator 18 to 49		July 22, 2006	?:?:? AM	Transfer method, location, and time not recorded. USADA0200 suggests before 11:02 AM.	USADA0015 USADA0253
20.	Aliquoting for IRMS	Mongongu (49)	July 22, 2006	11:20 AM		USADA0015 USADA0253
21.	Transfer bottle from operator 49 to 18		July 22, 2006	?:?:? AM	Transfer method, location, and time not recorded.	USADA0015 USADA0253
22.	Return to refrigerator	Cerpolini (18)	July 22, 2006	12:45 PM	'A' at 4°C, CH.FR.1.	USADA0015 USADA0253
23.	Removal from refrigerator	Cariou (28)	July 23, 2006	2:30 PM		USADA0017 USADA0253
24.	Aliquoting for T/E confirmation #2	Cariou (28)	July 23, 2006	3:00 PM		USADA0017 USADA0253
25.	Return to refrigerator	Cariou(28)	July 23, 2006	5:00 PM	'A' at 4°C, CH.FR.1. Two-hour delay in return of sample to refrigerator.	USADA0017 USADA0253

...continues next page

	<b>'A' Sample Aliquots</b>						
	<b>'A' Sample T/E Screenings</b>						
26.	Storage in freezer	Cerpolini (18)	July 24, 2006	8:20 AM	'A' at -20°C. CH.FR.5.		USADA0020 USADA0253
27.	1 <sup>st</sup> preparation/chemistry begins	Depres (35)	July 21, 2006	9:40 AM			USADA0011 USADA0255
28.	1 <sup>st</sup> preparation/chemistry ends	Depres (35)	July 21, 2006	2:45 PM	SOP M-EX-04 on USADA0037-0039.		USADA0011 USADA0043
29.	1 <sup>st</sup> analysis begins	Galatola (37) Cerpolini (18)	July 21, 2006	7:36 PM	GC/MS MSD18.		USADA0013 USADA0054
30.	1 <sup>st</sup> analysis ends	Galatola (37) Cerpolini (18)	July 22, 2006	?:?: ??	Machine run overnight. No sequence file provided. Sample was vial 11.		USADA0013 USADA0054
31.	1 <sup>st</sup> screening analysis read	Cerpolini (18)	July 22, 2006	?:?: ??	Box top right corner USADA0054. <b>Inhibited derivatization noted. Data unreliable, used to proceed to confirmation and IRMS nonetheless.</b>	T E T/E	60.6 13.7 4.9 USADA0013 USADA0054
32.	2 <sup>nd</sup> preparation/chemistry begins From 2 <sup>nd</sup> confirmation preparation	Cariou (28)	July 23, 2006	3:00 PM	Note top right of page. "Vial de conf réinjecté en screening." Chemistry from confirmation. SOP M-EX-04B on USADA0074-0076. <b>Chain of custody for this aliquot undocumented.</b>		USADA0057 USADA0079
33.	2 <sup>nd</sup> preparation/chemistry ends From 2 <sup>nd</sup> confirmation preparation	Cariou (28)	July 24, 2006	10:54 AM	Note on top right of page. Reproduced from event number 40, below. <b>Chain of custody for this aliquot undocumented.</b>		USADA0057 USADA0079
34.	2 <sup>nd</sup> screening analysis begins	Zavodski (45) Depres (35)	July 25, 2005	?:?? PM	GC/MS MSD19.		USADA0057
35.	2 <sup>nd</sup> screening analysis ends	Zavodski (45) Depres (35)	July 25, 2005	?:?? PM	No sequence file provided. Sample was vial 2.		USADA0057
36.	2 <sup>nd</sup> screening analysis read	Buisson (10)	July 25, 2005	?:?? PM	<b>Andro-D4 not added in chemistry. Read as 170 ng/mL. Chain of custody for this aliquot undocumented.</b>	T E T/E	49.7 11.1 5.1 USADA0020 USADA0057

...continues next page



	'A' Sample T/E Confirmations							
37.	1 <sup>st</sup> preparation/chemistry begins	Cerpolini (18)	July 22, 2006	11:02 AM	SOP M-EX-04B on USADA0074-0076. <b>At least 15 errors on page.</b>	SG pH	1.025 5.22	USADA0256 USADA0200
38.	1 <sup>st</sup> preparation/chemistry ends	Cerpolini (18)	July 22, 2006	4:00 PM	<b>At least 15 errors on page.</b>			USADA0256 USADA0200
39.	1 <sup>st</sup> T/E analysis begins	Cerpolini (18)	July 22, 2006	6:02 PM	GC/MS MSD20. Sample is vial 10. <b>Calibration date reported after date acquired.</b>			USADA0256 USADA0212
40.	1 <sup>st</sup> T/E analysis ends	Cerpolini (18)	July 24, 2006 July 23, 2006	<12:57 PM <?:?? PM	Last date and time recorded bottom right-hand corner. <b>Internal standard problem noted by lab.</b>	T E T/E	172.2 17.57 10.7	USADA0212 USADA0191
41.	1 <sup>st</sup> T/E, unhydrolyzed analysis begins	Cerpolini (18)	July 22, 2006	6:33 PM	Sample is vial 11. <b>Calibration date reported after date acquired.</b>			USADA0256 USADA0214
42.	1 <sup>st</sup> T/E, unhydrolyzed analysis ends	Cerpolini (18)	July 22, 2006	?:?? PM		T E T/E	1.06 0.10 11.2	USADA0256 USADA0214
43.	1 <sup>st</sup> T/E analysis read	Cerpolini (18)	July 24, 2006 July 23, 2006	<12:57 PM <?:?? PM	Last date and time recorded bottom right-hand corner. <b>Internal standard out of retention time specification.</b>	T corr E corr	127 13	USADA0223 USADA0212 USADA0191
44.	1 <sup>st</sup> T/E, analysis rejected	Cerpolini (18)	July 23, 2006	>?:?? PM	<b>Internal standard amount low. Standard out of retention time specification.</b>			USADA0191
45.	2 <sup>nd</sup> preparation/chemistry begins	Cariou (28)	July 23, 2006	3:00 PM	<b>Incorrect reference solution concentrations.</b>	SG pH	From 1 <sup>st</sup> From 1 <sup>st</sup>	USADA0256 USADA0079
46.	2 <sup>nd</sup> preparation/chemistry ends	Cariou (28)	July 24, 2006	10:54 AM	Preparation continues from previous day. <b>Incorrect reference solution concentrations.</b>			USADA0256 USADA0079
47.	2 <sup>nd</sup> T/E analysis begins	Cariou (28)	July 24, 2006	1:28 PM	GC/MS MSD20. Sample is vial 4. <b>Calibration time reported after time acquired.</b>			USADA0092
48.	2 <sup>nd</sup> T/E analysis ends	Cariou (28)	July 24, 2006	>>5:17 PM	Last date and time recorded bottom right-hand corner.	T E T/E	61.37 5.20 11.4	USADA0092
49.	2 <sup>nd</sup> T/E unhydrolyzed analysis	Cariou (28)	????	?:?? ??	<b>No evidence this was performed.</b>			<b>Undocumented</b>
50.	2 <sup>nd</sup> T/E analysis read	Cariou (28) Cerpolini (18)	July 24, 2006	>5:17 PM	Last date and time recorded bottom right-hand corner.	T corr E corr	45.4 3.9	USADA0092 USADA0101 USADA0256

...continues next page

	'A' Sample IRMS						
51.	Preparation/chemistry begins	Mongongu (49)	July 22, 2006	11:20 AM	Prep begins with pH. <b>Unusual to begin IRMS without T/E confirmation.</b> Chain of custody is not documented on USADA0256 but can be constructed from USADA0120.		USADA0256 USWADA0120
52.	Preparation/chemistry ends	Mongongu (49)	July 23, 2006	2:30 PM	Preparation continues from previous day.		USADA0256 USWADA0121
53.	GC/MS F3	Mongongu (49)	July 23, 2006	11:33 AM 12:00 PM	GC/MS MSD22. Sample is vial 3. Print time may be finish time.		USADA0256 USADA0144
54.	GC/MS F1	Mongongu (49)	July 23, 2006	12:42 PM 1:14 PM	GC/MS MSD22. Sample is vial 5. Print time may be finish time.		USADA0256 USADA0134
55.	GC/MS F2	Mongongu (49)	July 23, 2006	1:47 PM 2:22 PM	GC/MS MSD22. Sample is vial 7. <b>Bad chromatography. Overload?</b>		USADA0256 USADA0140
56.	GC/MS F2 dilution	Mongongu (49)	July 23, 2006	2:33 PM 3:01 PM	GC/MS MSD22. Sample is vial 7. Reinjection. Print time may be finish time.		USADA0256 USADA0138
57.	Preparation for IRMS	Mongongu (49)	July 23, 2006	3:00 PM	F2 SI addition and minor steps take 10 minutes.		USADA0122
58.	IRMS F3	Mongongu (49)	July 23, 2006	12:24 PM 4:08 PM	IRMS Isoprime1. Sample is vial 4. Current time may be finish time. <b>Time lag is unexplained.</b>	5β Adiol -23.73 5α Adiol -27.72 5β Pdiol -21.58	USADA0256 USADA0172 USADA0185
59.	IRMS F1	Mongongu (49)	July 23, 2006 July 24, 2006	1:56 PM 12:23 PM	IRMS Isoprime1. Sample is vial 6. Current time may be finish time. <b>Day/time lag is unexplained.</b>	Keto -21.06	USADA0256 USADA0160 USADA0185
60.	IRMS F2	Mongongu (49)	July 23, 2006	3:25 PM 4:10 PM	IRMS Isoprime1. Sample is vial 8. Current time may be finish time.	Etio -23.63 Andro -25.05	USADA0256 USADA0166 USADA0185
61.	IRMS analysis read	Mongongu (49)	July 23, 2006	>9:23 PM	Earliest possible time of analysis. <b>Values do not include measurement of uncertainty.</b>	Etio -2.58 Andro -3.99 5β Adiol -2.15 5α Adiol -6.14	USADA0155 USADA0186

...continues next page

	Event		Date	Time	Comments		Bates
	<b>'B' Sample Preliminaries</b>						
62.	Landis letter	Landis	July 31, 2006	7:10 PM	Request for 'B' analysis.		USADA0239
63.	UCI letter	Varin	July 31, 2006	5:41 PM	Request for 'B' analysis.		USADA0231
64.	USADA letter	Tygart	July 31, 2006		Request for 'B' analysis.		USADA0237
65.	LNDD letter	Ceaurriz	August 1, 2006	11:47 AM	LNDD sets date and time for 'B' analysis.		USADA0247
	<b>'B' Sample Container</b>						
66.	B sample removed from freezer	Cerpolini (18)	August 3, 2006	9:12 AM	Operator ID from USADA0014.		USADA0254
67.	Transfer bottle from operator 18 to 26		August 3, 2006	??:?? AM	<b>Transfer method, location, and time not recorded.</b>		USADA0014 USADA0253
68.	Aliquoting for IRMS	Frelat (26)	August 3, 2006	11:03 AM	Operator ID from USADA0013.		USADA0254
69.	Transfer bottle from operator 26 to 23		August 3, 2006	??:?? AM	<b>Transfer method, location, and time not recorded.</b>		USADA0014 USADA0253
70.	Aliquoting for T/E	Barlagne (23)	August 3, 2006	11:05 AM	Operator ID from USADA0013.		USADA0254
71.	B sample bottle (empty) returned to freezer or destroyed	Unknown	Unknown		<b>There is no chain of custody record as to what happened to the 'B' bottle.</b>		USADA0254

...continues next page

	<b>'B' Sample Aliquots</b>							
	<b>'B' Sample T/E</b>							
72.	Preparation/chemistry begins	Barlagne (23)	August 3, 2006	11:45 AM	SOP M-EX-04B on USADA0261-0263.	SG pH	1.025 5.18	USADA0256 USADA0264
73.	Preparation/chemistry ends	Barlagne (23)	August 3, 2006	4:25 PM				USADA0264
74.	1 <sup>st</sup> run begins	Barlagne (23)	August 3, 2006	6:43 PM	GC/MS MSD20. Sample is vial 4. <b>All in same batch.</b>			USADA0256 USADA0278
75.	1 <sup>st</sup> run ends	Barlagne (23)	August 4, 2006	7:39 AM	Finish time from stamp bottom right of page.	T E T/E	63.15 5.94 10.9	USADA0278
76.	2 <sup>nd</sup> run begins	Barlagne (23)	August 3, 2006	7:14 PM	GC/MS MSD20. Sample is vial 5.			USADA0256 USADA0279
77.	2 <sup>nd</sup> run ends	Barlagne (23)	August 4, 2006	7:35 AM	Finish time from stamp bottom right of page.	T E T/E	61.64 5.75 11.0	USADA0279
78.	3 <sup>rd</sup> run begins	Barlagne (23)	August 3, 2006	7:45 PM	GC/MS MSD20. Sample is vial 6.			USADA0256 USADA0281
79.	3 <sup>rd</sup> run ends	Barlagne (23)	August 4, 2006	7:36 AM	Finish time from stamp bottom right of page.	T E T/E	60.18 5.55 11.1	USADA0281
80.	Unhydrolyzed run begins	Barlagne (23)	August 3, 2006	8:16 PM	GC/MS MSD20. Sample is vial 7. <b>Chain of custody record does not document this aliquot portion.</b>			USADA0256 USADA0283
81.	Unhydrolyzed run ends	Barlagne (23)	August 4, 2006	7:37 AM	Finish time from stamp bottom right of page.	T E T/E	1.22 0.44 3.6	USADA0283
82.	Analysis read	Barlagne (23) Cerpolini (18)	August 4, 2006	>7:39 PM	Last date and time from stamp recorded bottom right-of page.	T corr E corr	45.7 4.2	USADA0288 USADA0278

...continues next page

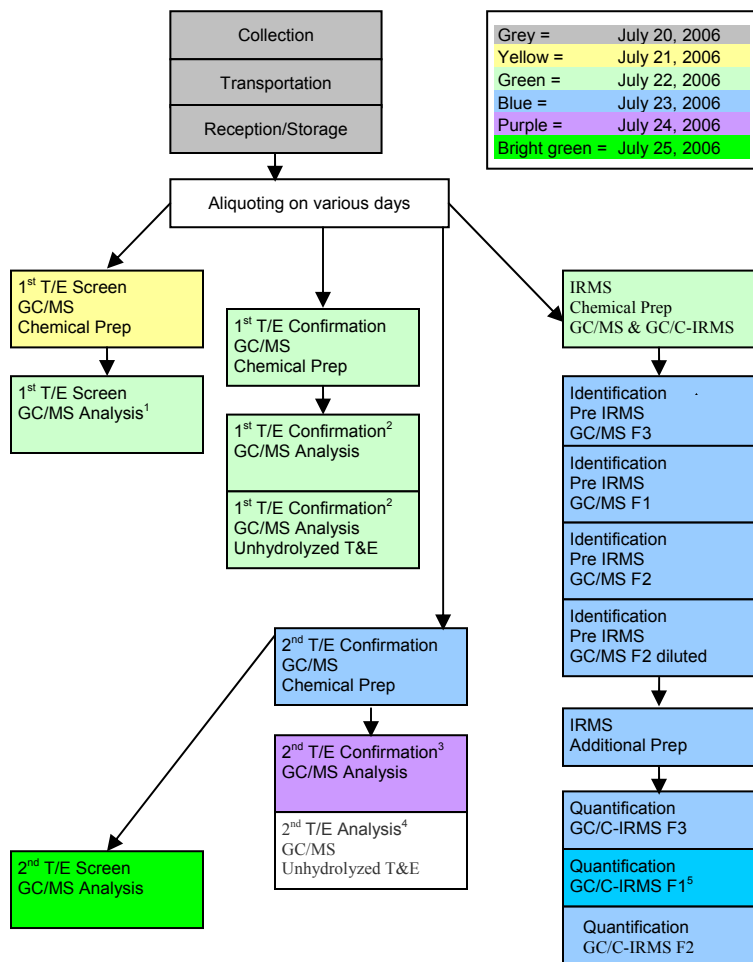
	'B' Sample IRMS						
83.	Preparation/chemistry begins	Frelat (26)	August 3, 2006	11:26 AM	M-EX-24 SOP on USADA0295-0298. Chain of custody is not documented on USADA0257 but can be constructed from USADA0300.		USADA0257 USADA0300
84.	Preparation/chemistry ends	Frelat (26)	August 4, 2006	1:18 PM	Preparation continues from previous day.		USADA0257 USADA0299
85.	GC/MS F3	Frelat (26)	August 4, 2006 August 4, 2006	1:54 PM 2:43 PM	GC/MS MSD22. Sample is vial 3. Print time may be finish time. <b>Chain of custody record mismatch. Event recorded as occurring on August 3, 2006.</b>		USADA0321 USADA0257
86.	GC/MS F1	Frelat (26)	August 4, 2006 August 4, 2006	2:59 PM 3:27 PM	GC/MS MSD22. Sample is vial 5. Print time may be finish time. <b>Chain of custody record mismatch. Event recorded as occurring on August 3, 2006.</b>		USADA0313 USADA0257
87.	GC/MS F2	Frelat (26)	August 4, 2006 August 4, 2006	4:03 PM 4:31 PM	GC/MS MSD22. Sample is vial 7. Print time may be finish time. <b>Chain of custody record mismatch. Event recorded as occurring on August 3, 2006.</b>		USADA0317 USADA0257
88.	Preparation for IRMS	Frelat (26)	August 4, 2006	4:45 PM	SI addition and minor steps take 15 minutes.		USADA0301
89.	IRMS F3	Frelat (26)	August 4, 2006 August 5, 2006	5:48 PM 8:54 PM	IRMS Isoprime1. Sample is vial 4. Current time may be finish time. <b>Chain of custody record mismatch. Event recorded as occurring on August 3, 2006.</b>	5β Adiol -23.69 5α Adiol -27.43 5β Pdiol -21.05	USADA0350 USADA0351 USADA0257
90.	IRMS F1	Frelat (26)	August 4, 2006 August 5, 2006	7:18 PM 8:07 AM	IRMS Isoprime1. Sample is vial 6. Current time may be finish time. <b>Chain of custody record mismatch. Event recorded as occurring on August 3, 2006.</b>	Keto -21.78	USADA0338 USADA0351 USADA0257
91.	IRMS F2	Frelat (26)	August 4, 2006 August 5, 2006	8:47 PM 8:03 AM	IRMS Isoprime1. Sample is vial 8. Current time may be finish time. <b>Chain of custody record mismatch. Event recorded as occurring on August 3, 2006.</b>	Etio -23.80 Andro -25.29	USADA0344 USADA0351 USADA0257
92.	IRMS analysis read	Frelat (26)	August 4, 2006	>10:17 PM	Earliest possible time of analysis. <b>Values do not include measurement of uncertainty.</b>	Etio -2.02 Andro -3.51 5β Adiol -2.65 5α Adiol -6.39	USADA0331 USADA0352

...continues next page

	Event		Date	Time	Comments		Bates
	Post Stage 17						
93.	Peloton knows of positive top 10 rider		July 23, 2006	?:?? AM	Leak known morning of last TdF stage. Source: Denise Demir.		
94.	Tour de France ends		July 23, 2006	PM	2006 Tour de France ends.		
95.	Pereiro knows of positive test		July 25, 2006		Oscar Pereiro interview, cyclingnews.com. February 27, 2007. <a href="#">Accessed Mar 1, 2007.</a>		
96.	LNDD notifies UCI		July 25, 2006	6:19 PM	Time uncertain. Fax time hard to read.		USADA0375
97.	UCI sends 'A' sample notification		July 26, 2006				USADA0371

**Table 7. Timeline of analysis of sample number 95474. Testosterone and epitestosterone values are uncorrected, unless noted as “corr.” Isotope values are corrected.**

## 'A' Sample Workflow Overview



<sup>1</sup>LNDD recognized 1<sup>st</sup> screen analysis flawed. USADA0054.

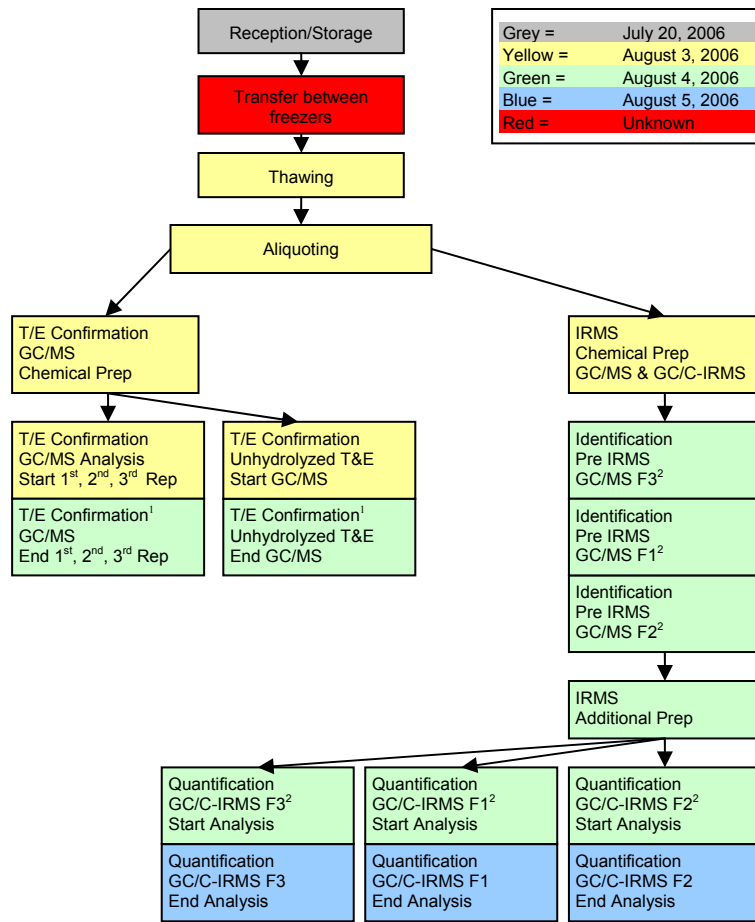
<sup>2</sup>LNDD recognized T/E confirmation analysis flawed. USADA0191.

<sup>3</sup>AAA Panel Award unanimously recognized all T/E confirmation analyses flawed. Point 160.

<sup>4</sup>No evidence this procedure performed.

<sup>5</sup>Procedure begun on 23-07 2006. Uncertain whether finish on this day or next.

## 'B' Sample Workflow Overview



<sup>1</sup> AAA Panel Award unanimously recognized all T/E confirmation analyses flawed. Point 160.

<sup>2</sup> "Chain of Custody" mismatch. Event recorded as on 3-08-2006 on USADA0257.



### \*\*\*4C. Document Package Riddled with Errors Page Documents Poor Overall Quality at LNDD

ISL Violation<sup>137</sup>  
ISO Violation  
TD2003LCOC Violation

ISL 5.4.2.2:<sup>138</sup>

“All personnel should have thorough knowledge of their responsibilities including the security of the Laboratory, confidentiality of results, Laboratory Internal Chain of Custody protocols, and the standard operating procedures for any method that they perform.”

ISO 17025. 4.3.3.3:<sup>139</sup>

“If the laboratory’s document control system allows for the amendment of documents by hand pending the re-issue of the documents, the procedures and authorities for such amendments shall be defined. Amendments shall be clearly marked, initialed and dated. A revised document shall be formally re-issued as soon as practicable.”

ISO 17025. 4.13.2.3:<sup>140</sup>

“When mistakes occur in records, each mistake shall be crossed out, not erased, made illegible or deleted, and the correct value entered alongside. All such alterations to records shall be signed or initialed by the person making the correction. In the case of records stored electronically, equivalent measures shall be taken to avoid loss or change of original data.”

<sup>137</sup> For more on the significance of ISL and other violations, see page 16.

<sup>138</sup> WADA International Standard for Laboratories. 5.4.2.2, (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>139</sup> International Organization for Standardization. ISO 17025. 4.3.3.3. (2005). <http://www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=39883>. Accessed Dec 28, 2006.

<sup>140</sup> International Organization for Standardization. ISO 17025. 4.13.2.3. (2005).

TD2003LCOC:<sup>141</sup>

“Any forensic corrections that need to be made to the comment should be done with a single line through and the change should be initialed and dated by the individual making the change. No white out or erasure that obliterates the original entry is acceptable.”

### USADA0200.

As shown in Figure 50, this page exemplifies the laboratory’s sloppiness.

There are at least 15 errors on this page.

### Cross-outs

*There are at least seven cross-outs on this page.*

Cross-outs are circled in red in Figure 50.

As discussed elsewhere in this document, one must cross out the error with a single line, write the correction, the date, and initial.

<sup>141</sup> WADA TD2003LCOC. (2003). Laboratory Internal Chain of Custody. [http://www.wada-ama.org/rtecontent/document/chain\\_custody\\_1\\_2.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/chain_custody_1_2.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.

**Figure 50. USADA0200. This page is riddled with at least 15 errors—including 7 cross-outs and 7 reference solution errors.**

### Reference solution errors

**There are seven reference solutions recorded on USADA0200. Every single reference solution is incorrect.**

From discovery, we have obtained records of the reference solution concentrations. These are found on LNDD0263, LNDD0265, LNDD0267, and LNDD0269.

Methyltestosterone reference solution error

USADA0200 (Figure 51) shows that the internal reference standard methyltestosterone has a concentration of 4 milligrams per liter. LNDD0263 (Figure 52) shows that the concentration of this solution is 8 milligrams per liter. This error could result in 100% difference values.

Substance (TP, REF, SI, ...)	Code col ref	Case col ref	1
SI: Methyltestosterone	H3-046	umall	50
Epitestosterone	H3-033	Anglyl	2+

information

USADA 0200

181

**Figure 51. USADA00200. Selected screenshots of the page. The document package shows that the concentration of the internal reference standard methyltestosterone is 4 mg/L for SI3-046.**

N° d'identification de la substance de référence : SI 3							
Nom du produit : 17 $\alpha$ METHYLTTESTOSTERONE							
Solvant : MEOL							
					N°		
5 044	2005 05-12 2005	V9	044	—	87ml	—	174ml
6 046	06-12 2005	V9	Sigma	M7252 85 Feb 07	vinyg	6	550ml
							6 mg/L
							CH-FR-1
							8mg/L
							Angel?

**Figure 52. LNDD0263. Selected screenshots of the page. The laboratory's control documentation record shows that for the SI3-046 solution, the concentration of the internal reference standard methyltestosterone is 8 mg/L.**

### Epitestosterone reference solution errors

One obvious error is boxed in green in Figure 50.

USADA0200 (Figure 53) shows the epitestosterone reference solution H7-033 as containing both 1 ng/μL and 10 ng/μL—as listed on the first and third lines in the red box.

There has been a mix-up here. Either the wrong reference solution number was recorded, or the wrong reference solution was used. In fact, both are wrong.

LNDD0269 (Figure 54) records the concentration of H7-033 as 1mg/mL—an either one-hundred-fold or one thousand-fold difference.

The epitestosterone value for H7-032 is listed as 1 ng/μL on USADA0200 (Figure 55). It is listed as 1 mg/mL on LNDD0269 (Figure 54)—a thousand-fold difference.

Epitestosterone	H7-033	1 ng/μL
	H7-032	1 ng/μL
	H7-033	10 ng/μL

Figure 53. USADA0200. Epitestosterone reference H7-033 concentrations are listed both as 1 ng/μL and as 10 ng/μL. Concentration for H7-032 is listed as 1 ng/μL.

Solvant : MeSH							
Code Solut*	Date Prép	Code Op	Fournisseur	Référence N° de lot	Masse / Volume	N° de balance	Vol. final solution (mL)
H7-033	12/12/2005	26	Sigma	E-5878 100H4021	14 μg	6	7.4
							1

Figure 54. LNDD0269. Epitestosterone reference concentration for H7-033 is listed as 1 mg/mL.

Solvant : MeSH							
Code Solut*	Date Prép	Code Op	Fournisseur	Référence N° de lot	Masse / Volume	N° de balance	Vol. final solution (mL)
H7-032	12/12/2005	26	Sigma	E-5878 100H4021	9.0 μg	6	9.0
							1

Figure 55. LNDD0269. Epitestosterone reference concentration for H7-032 is listed as 1 mg/mL.

### Testosterone reference solution errors

USADA0200 (Figure 56) shows the testosterone reference solution H10-031 as containing 10 ng/μL. H10-034 is also shown as containing 10 ng/μL. H10-035 is shown as containing 1 ng/μL.

LNDD0265 (Figure 57) records the concentration of H10-031 as 0.1mg/mL—a ten-fold difference.

LNDD0267 (Figure 58) records the concentration of H10-034 as 0.1mg/mL—a ten-fold difference.

LNDD0267 (Figure 59) records the concentration of H10-035 as 0.1mg/mL—a one-hundred-fold difference.

Testosterone	H10-035	1 ng/μL
	H10-034	10 ng/μL
	H10-031	10 ng/μL

Figure 56. USADA0200. Testosterone reference H10-035 concentration is listed as 1 ng/μL. Concentration for H10-034 and H10-031 are listed as 10 ng/μL.

H10-031	12/12/2005	25	Sigma	T5411 065K8803	3 μL	30 mL	0.1
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Figure 57. LNDD0265. Testosterone reference concentration for H10-031 is listed as 0.1 mg/mL.

Solvant : MeSH							
Code Solut*	Date Prép	Code Op	Fournisseur	Référence N° de lot	Masse / Volume	N° de balance	Vol. final solution (mL)
H10-034	12/12/2005	26	Sigma	T5411 065K8803	1 μL	—	10
							0.1

Figure 58. LNDD0267. Testosterone reference concentration for H10-034 is listed as 0.1 mg/mL.

H10-035	12/12/2005	26	Sigma	T5411 065K8803	1 μL	—	10
							0.1

Figure 59. LNDD0267. Testosterone reference concentration for H10-035 is listed as 0.1 mg/mL.

For more on reference solution errors, see *Reference Solution Errors* on page 141.

### ***Hanging 'T'***

This error is circled in green in Figure 50.

The analyst wrote a *T* underneath *Epitestosterone*.

Does this mean that the next reference solution is testosterone, or that the analyst was going to write *Testosterone* and aborted her effort?

### ***Date Error?***

This possible error is shown in Figure 60. This may be an incorrect date entry; it is not included in our list of 15 errors.

We are not sure what this entry should be. From information elsewhere on this page and in the document package, it appears that this should be a date not more than a month into the future.

Lieu :	
Bain à sec n° : 17	Ⓔ
Dérivation 1	
Bain à sec n° : 13	
Micro onde	
Code ou dlu du réactif 1 : 02/08/07	Ⓔ
Dérivation 2	
Bain à sec n° :	
Dlu réactif 2 :	

Figure 60. USADA0200. If 02/08/07 is the date August 2, 2007, it may be incorrect.

Arnie's comment:

As noted in the introductory section of this book, although some mistakes, boo-boos if you will, are acceptable, *the magnitude of* laboratory errors in this case is *appalling*.

As many stunned scientists and teachers have agreed, if these documents were submitted in a high school chemistry class, the student would fail.





## USADA0008.

In the middle of the page, second column, a sample is listed as 995475.

Landis's Stage 17 number was 995474.

Landis's sample was analyzed from July 21 through July 25, 2006.

Figure 64. USADA0008. The sample number 995475 and the sample number 995474 both appear. Are there two samples whose values are being reported, or has the laboratory made a documentation error?

The LNDD denies the possibility of mix-up; they state the samples were not analyzed on the same date (Figure 65).

11. A search of LNDD records back to 2001 does not reflect the receipt of any sample numbered 994474. Sample #995475 was received at LNDD on 22 July 2006. Sample #995476 was received by LNDD on 2 July 2006. Neither of these samples was analyzed in the same batch or even on the same day as Mr. Landis's Sample #995474. Since Samples #995475 and #995476 correspond to other athletes, LNDD cannot provide any information with respect to the analytical results of those samples without the consent of the relevant International Federation. LNDD is providing a list of sample numbers for samples received in July 2006.

Figure 65. Discovery Exhibit B, page 4. LNDD denies any possibility of mix-up. They state the samples were not analyzed on the same day.

"Neither of these samples was analyzed in the same batch or even on the same day as Mr. Landis's Sample #995474."  
Landis's Stage 19 number was 994080.

The Tour athletes are separated into two groups for doping control. Each group has three athletes.

One of the other athletes on this stage had number 995475, a number we identified in Landis's Stage 17 report on USADA0008.

Reports in Figure 66 clearly state that samples 995474 and 995475 were both analyzed on July 23, 2006.

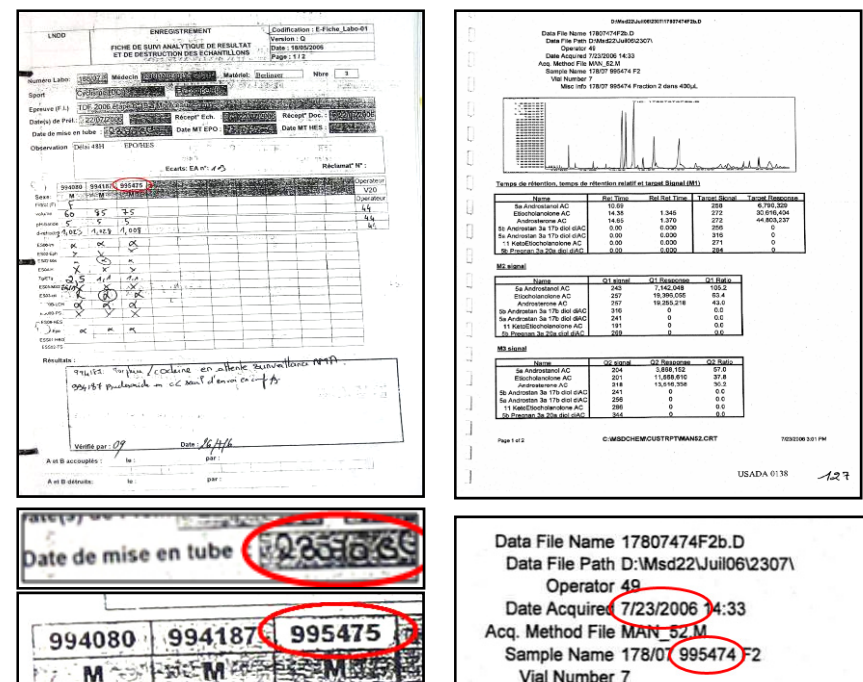


Figure 66. The analysis of Landis's Stage 19 sample number 994080, as well as that of sample number 995475, took place on July 23, 2006 (left). This is on the same date as the confirmation of Landis's Stage 17 sample number 995474 results (right).

Arnie's comment:

The LNDD is wrong to assert that the samples were not analyzed on the same date.

Sample mix-up and/or adulteration cannot be excluded.

#### USADA0024. USADA0229.

These are the same pages, used for identification in the 'A' and the 'B' sample respectively.

Handwriting, as opposed to barcoded recording, is well known to create legibility errors. Perhaps the original might tell a different story. From my PDF file, the fifth sample listed as received from transport is 995476.

According to the International Standard for Laboratories<sup>142</sup>

"The Laboratory shall observe and document conditions that exist at the time of receipt that may impact on the integrity of a Sample report. For example, irregularities noted by the Laboratory should include, but are not limited to:

Sample identification is unacceptable. For example, the number on the bottle does not match the Sample identification number on the form."

Arnie's comment:

This page reflects a chain of custody issue: This page is about the transport of the sample from the race site to the lab.

From USADA0023 and the previous example, USADA0008, we know that containers with sequential numbers exist, and are probably grouped together.

In discovery, it was revealed that 995476 is a bona fide sample number received by the laboratory in July of 2006.

Serious chain-of-custody and laboratory mix-up issues exist.

The form is a receipt for sample collection. It contains the following information:

- Header:** LNDD, ENREGISTREMENT, Codification: E-AR-02, Version: C, Date: 28/06/2005, 1/1.
- Title:** ACCUSE DE RECEPTION DE PRELEVEMENTS sans document de livraison.
- Sub-header:** Cas d'un TRANSPORT AU LABORATOIRE par chauffeur sans document de livraison.
- Fields:**
  - Organisme: UCI
  - Epreuve et lieu: 17e Etape
  - Date du controle: 20/07/06
- Table:** A table with 4 columns labeled 'Code du flacon'. The first column contains handwritten numbers: 995476, 995477, 995478, 995479, 995480, 995481, 995482, 995483, 995484, 995485, 995486, 995487, 995488, 995489, 995490, 995491, 995492, 995493, 995494, 995495, 995496, 995497, 995498, 995499, 995500, 995501, 995502, 995503, 995504, 995505, 995506, 995507, 995508, 995509, 995510, 995511, 995512, 995513, 995514, 995515, 995516, 995517, 995518, 995519, 995520, 995521, 995522, 995523, 995524, 995525, 995526, 995527, 995528, 995529, 995530, 995531, 995532, 995533, 995534, 995535, 995536, 995537, 995538, 995539, 995540, 995541, 995542, 995543, 995544, 995545, 995546, 995547, 995548, 995549, 995550, 995551, 995552, 995553, 995554, 995555, 995556, 995557, 995558, 995559, 995560, 995561, 995562, 995563, 995564, 995565, 995566, 995567, 995568, 995569, 995570, 995571, 995572, 995573, 995574, 995575, 995576, 995577, 995578, 995579, 995580, 995581, 995582, 995583, 995584, 995585, 995586, 995587, 995588, 995589, 995590, 995591, 995592, 995593, 995594, 995595, 995596, 995597, 995598, 995599, 995600, 995601, 995602, 995603, 995604, 995605, 995606, 995607, 995608, 995609, 995610, 995611, 995612, 995613, 995614, 995615, 995616, 995617, 995618, 995619, 995620, 995621, 995622, 995623, 995624, 995625, 995626, 995627, 995628, 995629, 995630, 995631, 995632, 995633, 995634, 995635, 995636, 995637, 995638, 995639, 995640, 995641, 995642, 995643, 995644, 995645, 995646, 995647, 995648, 995649, 995650, 995651, 995652, 995653, 995654, 995655, 995656, 995657, 995658, 995659, 995660, 995661, 995662, 995663, 995664, 995665, 995666, 995667, 995668, 995669, 995670, 995671, 995672, 995673, 995674, 995675, 995676, 995677, 995678, 995679, 995680, 995681, 995682, 995683, 995684, 995685, 995686, 995687, 995688, 995689, 995690, 995691, 995692, 995693, 995694, 995695, 995696, 995697, 995698, 995699, 995700, 995701, 995702, 995703, 995704, 995705, 995706, 995707, 995708, 995709, 995710, 995711, 995712, 995713, 995714, 995715, 995716, 995717, 995718, 995719, 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996720, 996721, 996722, 996723, 996724, 996725, 996726, 996727, 996728, 996729, 996730, 996731, 996732, 996733, 996734, 996735, 996736, 996737, 996738, 996739, 996740, 996741, 996742, 996743, 996744, 996745, 996746, 996747, 996748, 996749, 996750, 996751, 996752, 996753, 996754, 996755, 996756, 996757, 996758, 996759, 996760, 996761, 996762, 996763, 996764, 996765, 996766, 996767, 996768, 996769, 996770, 996771, 996772, 996773, 996774, 996775, 996776, 996777, 996778, 996779, 996780, 996781, 996782, 996783, 996784, 996785, 996786, 996787, 996788, 996789, 996790, 996791, 996792, 996793, 996794, 996795, 996796, 996797, 996798, 996799, 996800, 996801, 996802, 996803, 996804, 996805, 996806, 996807, 996808, 996809, 996810, 996811, 996812, 996813, 996814, 996815, 996816, 996817, 996818, 996819, 996820, 996821, 996822, 996823, 996824, 996825, 996826, 996827, 996828, 996829, 996830, 996831, 996832, 996833, 996834, 996835, 996836, 996837, 996838, 996839, 996840, 996841, 996842, 996843, 996844, 996845, 996846, 996847, 996848, 996849, 996850, 996851, 996852, 996853, 996854, 996855, 996856, 996857, 996858, 996859, 996860, 996861, 996862, 996863, 996864, 996865, 996866, 996867, 996868, 996869, 996870, 996871, 996872, 996873, 996874, 996875, 996876, 996877, 996878, 996879, 996880, 996881



## USADA0009.

There has been a correction of number from 99~~2~~474 to 99~~5~~474.

### Arnie's comment:

As discussed elsewhere in this document, one must cross out the error with a single line, write the correction, date, and initial. This type of chart error would be an egregious one in medical practice. It is also against WADA Chain of Custody Protocols:<sup>144</sup>

“Any forensic corrections that need to be made to the comment should be done with a single line through and the change should be initialed and dated by the individual making the change. No white out or erasure that obliterates the original entry is acceptable.”

WADA labs are also governed by ISO 17025:<sup>145</sup> “When mistakes occur in records, each mistake shall be crossed out, not erased, made illegible or deleted, and the correct value entered alongside. All such alterations to records shall be signed or initialed by the person making the correction. In the case of records stored electronically, equivalent measures shall be taken to avoid loss or change of original data.”

Further, ignorance is not an excuse: “All personnel should have thorough knowledge of their responsibilities including the security of the Laboratory, confidentiality of results, Laboratory Internal Chain of Custody protocols, and the standard operating procedures for any method that they perform.”<sup>146</sup>

Further, ISO 17025 states that all personnel must be qualified to carry out the appropriate analysis. As such, a qualified person should be fully aware of the WADA and ISO requirements.

LNDD ENREGISTREMENT Codification : E-Fiche-labo-01BIS  
Version : A  
Date : 01/07/2004 1/1

FICHE COMPLEMENTAIRE POUR LA CONCLUSION DES RESULTATS ANALYTIQUES

Numéro de la feuille: 1

Numéro de Labo: 178/07

Analyses concernées:

☐ Analyses Conventionnelles Chimie GC ☐ Analyses Conventionnelles Chimie LC  
☐ Analyses Conventionnelles Immunochimie  
☒ Analyses Spécialisées Chimie GC: ☐ HES ☒ 12C/13C  
☐ Analyses Spécialisées Biologie: EPO  
☐ Analyses Spécialisées Biologie (et Chimie): HBOCs

CONCLUSION (à dater et signer par le Responsable technique):

995474: L'analyse de l'échantillon par spectro de masse de rapport isotopique ( $\delta^{13}C$ ) indique une origine exogène des métabolites de la testostérone, cohérente avec une prise de talco ou de l'un de ses précurseurs. L'origine exogène des métabolites de la testostérone a été objectivée sur la base d'un appauvrissement isotopique de 3,93‰ et 6,14‰, respectivement pour les métabolites androstérone et 5 $\alpha$ -androstane-3 $\alpha$ -diol. Seuil de positivité de l'HPLC: appauvrissement isotopique > 3‰ ( $\pm 0,8$ ‰ interne au laboratoire).

pH = 5,2 d = 1,025

le 25/07/06 [Signature]

USADA 0009

Figure 68. USADA0009. Unacceptable correction. Violates ISO17025 and WADA Chain of Custody regulations.

<sup>144</sup> WADA TD2003LCOC. Laboratory Internal Chain of Custody. 1. (2003). [http://www.wada-ama.org/rtecontent/document/chain\\_custody\\_1\\_2.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/chain_custody_1_2.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.

<sup>145</sup> International Organization for Standardization. ISO 17025. 4.12.2.3. (2005). <http://www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=39883>. Accessed Dec 28, 2006.

<sup>146</sup> WADA International Standard for Laboratories. 29. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

**USADA0004. USADA0079.**

A partial laboratory identification number or sample number has been crossed out without initial or date.

***Other Cross-Outs***

**USADA0043.**

There are at least two cross-outs without initial or date.

**USADA0044.**

This page refers to work on the control mixture started on July 20, 2006. This is a day before Landis's analysis was begun. There are at least two cross-outs without initial or date.

**USADA0200.**

This page shows at least six instances of cross-outs without date or initial. This also, is unacceptable.

Corrections found on USADA0068, USADA0077, and USADA0198 show the acceptable use of cross-outs, date, and initial. Such acceptable corrections lend credence to the belief that acceptable standards are known to laboratory personnel.

**LNDD2006.**

There are five non-forensic corrections on one of the methyltestosterone reference solution pages received in late discovery. See page 44.

Arnie's overall sample identification comment:

If they cannot keep track of the athlete, they cannot be trusted to keep track of anything.

"Off by one" laboratory errors in medicine are among the most common. In the practice of medicine, with drugs and transfusion reactions, this type of laboratory error kills patients.

When you misdial or miskey a telephone number, most of the time, you are off by just one digit.

### \*\*\*4E. Obsolete Hardware and Software

#### ISO Violation<sup>147</sup>

ISO 17025. 5.5.11:<sup>148</sup>

“Where calibrations give rise to a set of correction factors, the laboratory shall have procedures to ensure that copies (e.g. in computer software) are correctly updated.”

There are clearly correction factors that are software dependant.  
As noted by the laboratory in discovery:

- |   |
|---|
| 10. Background subtraction is embedded in the instrument software, which is proprietary to the instrument manufacturer. LNDD has no separate documentation. |
|---|

Figure 69. Correction factors are clearly software dependant. Claimant's Discovery of Feb.7, 2006, Exhibit B, page 10.

*The laboratory is in clear violation of the relevant ISO standards.*

<sup>147</sup> For more on the significance of ISL and other violations, see page 16.

<sup>148</sup> International Organization for Standardization. ISO 17025. 5.5.11. (2005).  
<http://www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=39883>.  
Accessed Dec 28, 2006.

### IRMS

- Hardware: **Isoprime1** JA010 Micromass. Installed October 7, 1998. One-year guarantee. (LNDD0234).
- Firmware: **IP V1.01E** (LNDD0238)
- Software: **Optima GC 1.67-2** (USADA0337).

#### *The Isoprime1 Machine*

##### **LNDD0231 and LNDD0234.**

The IsoPrime machine used to perform the examination of Landis's Stage 17 samples, (serial number JA010) was manufactured October 7, 1998 and installed on the same day. A form attesting to the manufacture date is on LNDD0231. A form attesting to the installation complete date is on LNDD0234.

#### Arnie's comment:

The manufacture and installation date cannot be the same. The discrepancy between manufacture date and installation date is unexplained.

Dr. Botrè, independent AAA expert, Telephone call May 2, 2007:

The machine is not networkable. Backups are not created automatically.

#### Simon Davis's comment:

“IsoPrimes installed worldwide: 285

Number of upgrades performed: 32

IsoPrimes remaining with OS2: 18”

“Of the 18 instruments using OS2, only 6 are GC/C-IRMS systems. The others use other systems looking at isotope ratios of carbonates, atmospheric gases and other environmental and geological applications. As such, these systems did not require upgrading.”

“The modern head amplifiers are 20 bit; it appears that the IsoPrime used for the analysis was only 8 bit. This results in significantly lower resolution. Our head of electronics is looking into to confirm.”

The Optima GC 1.67-2 software was originally written for the Micromass Optima IRMS and *not* the IsoPrime IRMS instrument. This software is now 10 years old and can be identified by its code number 1.67-2.

Since version 1.67-2 of software was produced, there have been six major version releases of software for the IsoPrime. These include:

1. Version 1.67-3 (OS2 operating system)
2. Version 1.67-4 (OS2 operating system),
3. MassLynx Version 3.5i (Windows NT),
4. MassLynx Version 3.6i (Windows NT),
5. MassLynx Version 4.0 (Windows XP) and
6. Ion Vantage Version 1.0 (Windows XP).

The newer versions of the software have the following improvements:

- a. The newer software includes a new set of electronics with a new set of firmware for the systems head amplifier that corrected errors in the code.
- b. The newer software has the ability to control the GC portion of the GC/C-IRMS (in the OS2 versions of the software, the operator has to manually program and run the GC).
- c. The newer software traces any changes that are made to the data post acquisition. For instance, if the software is re-processed with different integration parameters this would be recorded in all MassLynx and Ion vantage systems, but not in any OS2 systems.
- d. The newer software contains a standards library, for the automated storage and retrieval of standards values and data.

OS2 requires the standards to be applied manually post acquisition.

- e. The newer software has fully documented and tested background subtraction routines. The method and validity of the background routines in the OS2 software is unknown and undocumented. All documentation of the OS2 routines was lost when Micromass purchased Isotech (the developers of the original software).
- f. The newer software has improved peak detection – the true nature of the OS2 detection methods is unknown as no documentation remains as to the method used.
- g. The newer software provides “read-backs” that allow the true state of the IsoPrime to be observed and recorded. The OS2 system offers no read backs.
- h. The newer software works on a modern operating system for which you can obtain up-to-date antivirus and malware software. OS2 Warp (the latest software that version 1.67-2 will run on) is no longer supported by IBM and no antivirus or security software is available.
- i. The newer software is compatible with a number of Laboratory Integrated Management Systems (LIMS). This is used for the control of results management.

IsoPrime software updates are easy to obtain: they are available for download online at <http://www.gvinstruments.co.uk/LoginPage.asp>

Goodman<sup>149</sup> highlights one of the main problems with the OS2 1.67 software: The background subtraction routine attempts to remove any distortions in the chromatogram background (be they from tailing, UCM's, co-eluting peaks or simple column bleed),

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149 Goodman, K., et al. Curve Fitting for Restoration of Accuracy for Overlapping Peaks in Gas Chromatograph/Combustion Isotope Ratio Mass Spectrometry. Anal Chem. 66, 1294-1301. (1994). Linked at: <http://arniebakercycling.com/books/wiki.htm>.

however, the routine used is unknown and widely believed to be of poor quality.

Because of the age of the software, and the fact that it was not designed for this specific IRMS instrument, there is serious question about its being capable of delivering consistently accurate results. The new software would provide better peak detection, tested and documented background subtraction routines and would remove any errors in the head amplifier firmware. It would also provide a stable and modern operating system with up to date anti-virus and other security software.

### ***USADA Symposium Documents Need for Software Upgrades***

At the second annual USADA symposium on anti-doping science, roughly five years ago, held in Los Angeles August, 2003, Charles Douthitt presented *GC/C-IRMS: getting the right numbers*.<sup>150</sup>

He had this to say about upgrading software to the then current NT standard:

“In order to ensure the most consistent GC performance, the ThermoFinnigan ISODAT NT software includes full control over GC methods, injectors, and auto samplers.”

“The software must properly and consistently perform determination of baselines, peak integration and time shift corrections.”

“Proper correction for the contribution of  $^{12}\text{C}^{17}\text{O}^{16}\text{O}$  to mass 45. The new ISODAT NT software incorporates the newest and most powerful methods for performing this correction.”

**GC-C-IRMS: getting the right numbers**

Charles Douthitt  
ThermoFinnigan

The isotope ratio mass spectrometer (IRMS) is designed to precisely and accurately measure the difference in isotopic compositions between a sample and a reference gas. Considerations significant to achieving this goal in the practice of GC-IRMS include:

CAPILLARY GC: the best possible chromatographic resolution is imperative

1. Compounds undergo isotope fractionation in a capillary GC column, so that the front of a peak is generally enriched in  $^{13}\text{C}$  relative to the tail. It is not possible to perform peak deconvolution on GC-IRMS data, so the most accurate data requires the best possible separation of peaks
2. In order to ensure the most consistent GC performance, the new ThermoFinnigan ISODAT NT software includes full control over GC methods, injectors and auto samplers

GC INTERFACE: chromatographic resolution can only get worse, it can't be improved

3. The major design goal for the interface between the capillary GC and the IRMS was to do nothing that could degrade chromatographic resolution (e.g., no cold spots, no T connections, the reactors are small bore and are not packed)

SOFTWARE: data collection and data correction

4. The software must properly and consistently perform determination of baselines, peak integration and time shift corrections (required because of the isotope fractionation discussed in #1). The new ISODAT NT software includes significant enhancements to peak integration and baseline correction algorithms
5. Proper correction for the contribution of  $^{12}\text{C}^{17}\text{O}^{16}\text{O}$  to mass 45. The new ISODAT NT software incorporates the newest and most powerful methods for performing this correction.

**Figure 70. USADA0856. USADA symposium on IRMS urging software upgrades to the then newer NT version.**

<sup>150</sup> USADA0856. 2nd Annual USADA Symposium on Anti-Doping Science. Los Angeles, CA. August, 2003. Application of Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry to Doping Control. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

### ***UCLA Laboratory Protocol***

From: "Arnie Baker" <arnie@arniebakercycling.com>

Date: Sat, 24 Feb 2007 18:36:36

To: <pscott@agencyforcyclingethics.org>

Subject: Software

Q. Paul,

What sort of checking mechanism does UCLA have for its equipment/software?

For example, does UCLA receive regular software upgrade notices from the manufacturer?

Does it have a system in place to assure it is using the latest/best use/right kind?

A:

Yes on both counts. UCLA is in regular contact with the dealers of its instruments and continues maintenance contracts that involve periodic upkeep on all of them.

[pscott@agencyforcyclingethics.org](mailto:pscott@agencyforcyclingethics.org)

Sat 2/24/2007 7:59 PM

### ***Why Was More Modern Isoprime2 Not Used?***

In CAS testimony, Mongongu stated that the reason the more modern machine and software was not used was that the Isoprime2 was not yet accredited.

However, in response to discovery requests, we were provided the chromatograms of all IRMS positives between 2004 and 2006.

These records show that the machine was used in two positive results.

LNDD1748 to LNDD1754 was performed on October 10, 2005

LNDD1798 to LNDD1801 was performed on April 28, 2006.

Either Mongongu's testimony is defective, or the LNDD used an unaccredited machine to declare at least two positive athlete results.

#### \*\*\*4F. Reprocessing Samples Case Dispositive<sup>151</sup>

We were able to determine, only two weeks before arbitration, the laboratory operators *manually* correct peaks.

USADA's Pre-Arbitration Brief (103, page 61):

"Further, it is unlikely that any of the software upgrades referenced in Respondent's document production brief would have any impact on the reliability or accuracy of the instrument. Indeed, most of the upgrades references by Respondent are simply convenience items."

Contrary to USADA's assertion, reprocessing the electronic data files is case dispositive.

The reliability and accuracy of the OS2 software is proven unsupportable and not fit to purpose.

For details about the reprocessing, see page 206.

Never mind rerunning the electronic data files on modern software, the rerunning of Stage 17 EDFs on the *original* computer with the *original* OS2 software, by the *original* operator, shows results so at odds with the reported results that the accuracy of the laboratory is unsupportable.

***The laboratory either knew or should have known that its software was obsolete—outdated, inaccurate, and unsupported. It was therefore either negligent or incompetent.***

	995474	
	Original	Reprocessed
<b>A Sample</b>		
Etio - 11K	-2.58	-2.32
Andro - 11K	-3.99	-3.65
5B-Adiol – Pdiol	-2.15	-2.65
5A-Adiol – Pdiol	-6.14	-6.95
<b>B Sample</b>		
Etio - 11K	-2.02	-0.35
Andro - 11K	-3.51	-1.61
5B-Adiol – Pdiol	-2.65	-3.05
5A-Adiol – Pdiol	-6.39	-7.19

**Table 8. The delta/delta values of the originally processed and reprocessed data differed by as much as, or more, than the entire uncertainty budget. Table from GDC1350.**

#### Summary

Arnie's comment:

The arbitrators should consider the dispositive nature of this argument.

The rules must be strictly followed.

<sup>151</sup> Case dispositive: sufficiently important to decide/end/dispose of the case.



### **\*\*\*4G. Unexplained Time Gaps Procedure Smells of Manipulation**

#### **ISL Violation<sup>152</sup>**

ISL 5.2.6.1:<sup>153</sup>

“The Laboratory must have documented procedures to ensure that it maintains a coordinated record related to each Sample analyzed. In the case of an Adverse Analytical Finding, the record must include the data necessary to support the conclusions reported (as set forth in the Technical Document, Laboratory Documentation Packages). In general, the record should be such that in the absence of the analyst, another competent analyst could evaluate what tests had been performed and interpret the data.”

ISL 5.4.4.1.4:<sup>154</sup>

“All data entry, recording of reporting processes and all changes to reported data shall be recorded with an audit trail. This shall include the date and time, the information that was changed, and the individual performing the task.”

There are two issues here:

1. The principle of identical treatment.
2. The accuracy of USADA’s brief and the suspicious nature of time gaps given the totality of the case.

#### ***Identical Treatment***

“Identical treatment of sample and reference material (‘IT principle’)... should guide all isotope ratio determinations and evaluations.”<sup>155</sup>

In order to be assured of accurate results, samples must be analyzed in as close to identical conditions as practicable, including time.

#### ***Time Gaps Create Suspicion of Manipulation***

Just like the chain of custody, a timeline helps prove or disprove the lab’s methods.

As one measure of validation, the laboratory checks the accuracy in determining the expected values of its calibration acetate mix.

<sup>152</sup> For more on the significance of ISL and other violations, see page 16.

<sup>153</sup> WADA International Standard for Laboratories. 5.2.6.1.4. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>154</sup> WADA International Standard for Laboratories. 5.4.4.1.4. (2004).

<sup>155</sup> Werner R.A. and Brand W.A. Referencing strategies and techniques in stable isotope ratio analysis. *Rapid Commun. Mass Spectrom.*, 15. Page 501. (2001). <http://www3.interscience.wiley.com/cgi-bin/abstract/78003397/ABSTRACT>. Accessed Mar 1, 2007.

***Although USADA's brief (at point 79, page 35) states that the accuracy of the mix cal acetate was ascertained immediately before and after Landis's samples, this is simply not true. The record shows otherwise.***

The batch sequence is a group of samples run together. These samples are placed on an autoloader, and sequentially, robotically, loaded into the machine and analyzed.

Time gaps, if any, should be explained. They are not.

In the analysis of Landis's Stage 17 sample number 995474, fourteen vials were run in the 'A' sample batch sequence. The sequence is shown in Table 9 on page 125.

In the 'A' sample IRMS analysis, there is an unexplained delay of approximately five hours between the run of Landis's last aliquot and the second acetate standard.

A screen shot from the last of Landis's fractions is shown in Figure 71. A screen shot from the acetate calibration mix run after this sample is shown in Figure 72.

In the 'B' sample IRMS analysis there is an unexplained delay of approximately four hours between the run of the first acetate standard and the first Blu (negative control) aliquot. The sequence is shown in Table 10 on page 125.

Our experts encountered similar unexpected and unexplained delays in the 'B' sample retesting of Landis's seven other 2006 Tour samples. They were often specifically told to expect results of such testing at a certain time, and then the laboratory had unexpected and unexplained delays. Our experts were prohibited from viewing the laboratory work that occurred during these time gaps.

These time gaps cast grave doubts on the integrity of the laboratory process.

We suspect the laboratory ran and reran the calibration mix until it achieved a satisfactory result.

Data Processing Results			
Data File Name	:	DATA 013	
Folder	:	230706	
Sample Name	:	178/07 995474 F2/400ul inj 1ul	
Sample ID	:		
Sample Position	:	8	
Injection Size	:	0.0000	
Sample Type	:	Sam	
Method	:	M-AN-41	
Batch Name	:		
RunTime User	:	micromass	
Acquisition Time	:	15:25:49	Date : 23/07/06
Current Time	:	16:10:51	Date : 23/07/06

**Figure 71. USADA0166. Landis's 'A' sample F2 aliquot was the penultimate IRMS sample run. This sample was acquired at 3:25 PM on July 23, 2006.**

Data Processing Results			
Data File Name	:	DATA 014	
Folder	:	230706	
Sample Name	:	Mix Cal Acetate 001A-2	
Sample ID	:		
Sample Position	:	2	
Injection Size	:	0.0000	
Sample Type	:	Sam	
Method	:	M-AN-41	
Batch Name	:	230706	
RunTime User	:	micromass	
Acquisition Time	:	20:39:04	Date : 23/07/06
Current Time	:	24:24:44	Date : 24/07/06

**Figure 72. USADA0183. The Mix Cal Acetate aliquot was the last IRMS sample run. This sample was acquired at 8:39 PM on July 23, 2006. A five-hour gap is unexplained.**

The time gaps in the ‘A’ and ‘B’ samples are shown in Table 9 and in Table 10.

	Aliquot	Start	Time Gap	Bates Stamp
1	Stabilite 1	Unknown		Not found
2	Stabilite 2	Unknown		Not found
3	Stabilite 3	9:50 AM		USADA0177
4	Mix Cal IRMS 003-1	10:01 AM	11 minutes	USADA0178
5	Mix Cal IRMS 003-2	10:17 AM	16 minutes	USADA0179
6	Mix Cal IRMS 003-3	10:33 AM	16 minutes	USADA0180
7	Mix Cal Acetate 001A-1	10:53 AM	20 minutes	USADA0181
8	Blu 1 pool 4 F3	11:40 AM	47 minutes	USADA0169
9	178/07 995474 F3	12:24 PM	44 minutes	USADA0172
10	Blu 1 pool 4 F1	1:11 PM	47 minutes	USADA0157
11	178/07 995474 F1	1:56 PM	45 minutes	USADA0160
12	Blu 1 pool 4 F2	2:41 PM	45 minutes	USADA0163
13	178/07 995474 F2	3:25 PM	44 minutes	USADA0166
14	Mix Cal Acetate 001A-2	8:39 PM	5 hours, 14 minutes	USADA0183
	Overall batch report	9:23 PM		USADA0155

**Table 9. Time gaps in IRMS acquisition of ‘A’ sample vials. There is a significant unexplained time gap *after* the running of last Landis’s ‘A’ sample aliquot on July 23, 2006. Contrary to USADA’s brief, an unexplained time gap puts accuracy at issue.**

	Aliquot		Time Gap	Bates Stamp
1	Stabilite 1			
2	Stabilite 2			
3	Stabilite 3			
4	Stabilite 4			
5	Stabilite 5	11:08 AM		USADA0356
6	Mix Cal IRMS 003-1	11:30 AM	22 minutes	USADA0357
7	Mix Cal IRMS 003-2	11:46 AM	16 minutes	USADA0358
8	Mix Cal IRMS 003-3	12:02 PM	16 minutes	USADA0359
9	Mix Cal Acetate 001A-1	12:24 PM	12 minutes	USADA0360
10	Blu 1 pool 4 F3	5:03 PM	4 hours, 39 minutes	USADA0347
11	178/07 995474 F3	5:48 PM	45 minutes	USADA0350
12	Blu 1 pool 4 F1	6:33 PM	45 minutes	USADA0335
13	178/07 995474 F1	7:18 PM	39 minutes	USADA0338
14	Blu 1 pool 4 F2	8:02 PM	44 minutes	USADA0341
15	178/07 995474 F2	8:47 PM	45 minutes	USADA0344
16	Mix Cal Acetate 001A-2	9:32 PM	45 minutes	USADA0362
17	Overall batch report	10:17 PM	45 minutes	USADa0331

**Table 10. Time gaps in IRMS acquisition of ‘B’ sample vials. There is a significant unexplained time gap *before* the running of Landis’s ‘B’ sample on August 4, 2006. Contrary to USADA’s brief, an unexplained time gap puts accuracy at issue.**

### \*\*\*4H. Batch Results Don't Match Individual Reports Procedure Smells of Manipulation

#### USADA0331. USADA0357. USADA0358. USADA0359.

The overall batch data processing results do not match the individual reports. The overall results page should identically match the results of the individual analyses.

In the 'B' sample, the overall batch results at USADA0331 list the delta values for the three runs of Mix Cal IRMS.

However, the three specific reports at USADA0357, USADA0358, and USADA0359 match only for the first run.

A similar problem plagues the 'A' sample analysis.

Arnie's comment:

Why do the second and third runs not match?

Some other values or analyses have been substituted in. There has been data destruction or deletion.

The chain of custody, documentation of work, file saving, or other process is defective.

Batch Data Processing Results										
Data File Name		:	040806							
Autoscan Setup File Name		:	040806							
Blank Subtraction		:	Disabled							
Background Subtraction		:	Disabled							
Reference Gas		:	Enabled							
Ref Gas Delta (C13)		:	-34.50							
Ref Gas Delta (O18)		:	-19.30							
Current Time		:	22:17:03							
Current Date		:	04/08/06							
-----										
No.	Sample Details		Elemental		Isotopic		% Comp	Delta		
	Name		Weight	Ref	Type		(C)	(C13)	(O18)	
			(mg)							
1	Stabilite 1		0.000	Sam						
2	Stabilite 2		0.000	Sam						
3	Stabilite 3		0.000	Sam						
4	Stabilite 4		0.000	Sam						
5	Stabilite 5		0.000	Sam						
6	Mix Cal IRMS 003-1		0.000	Sam				-31.30	-40	
7	Mix Cal IRMS 003-2		0.000	Sam				-31.68	-40	
8	Mix Cal IRMS 003-3		0.000	Sam				-31.42	-38	
9	Mix Cal Acetate 001A-100ng inj						0.000	Sam		

Figure 73. USADA0331. Overall batch data processing results. The three delta C13 values for the Mix Cal IRMS runs are listed.

Data Processing Results										
Data File Name	:	DATA 006								
Folder	:	040806								
Sample Name	:	Mix Cal IRMS 003-1								
Sample ID	:									
Sample Position	:	1								
Injection Size	:	0.0000								
Sample Type	:	Sam								
Method	:	M-AM-38								
Batch Name	:	040806								
RunTime User	:	micromass								
Acquisition Time	:	11:30:41	Date	:	04/08/06					
Current Time	:	11:46:25	Date	:	04/08/06					
Analysis of Reference Gas Data										
Ref Delta 13	=	-34.50				Ref Delta 18	=	-19.30		
Time		Major		Ratio 2/1		Ratio 3/1				
42.6		8.498E-8		1.1778E-2		4.2537E-3				
102.6		8.503E-8		1.1778E-2		4.2534E-3				
742.8		8.421E-8		1.1777E-2		4.2519E-3				
802.9		8.412E-8		1.1776E-2		4.2519E-3				
Std Dev Of Fit		1.2485E-7			1.0555E-7					
Analysis of Sample Peaks, with Zero Subtraction										
CO2										
Time	Height	Area		2/1		3/1	dC13Pk	d018		
191.6	5.57E-9	1.4452E-8		1.1796E-2		4.1786E-3	-32.30	-36.1		
259.1	4.36E-9	1.2956E-8		1.1848E-2		4.1803E-3	-27.78	-36.1		
350.9	4.90E-9	1.4134E-8		1.1801E-2		4.1745E-3	-31.79	-37.3		
538.2	5.18E-9	1.4106E-8		1.1805E-2		4.1624E-3	-31.30	-40.0		

Figure 74. USADA0357. The delta C13 value for the first Mix Cal run is -31.30 It matches the batch data report shown in Figure 73.

CO2	Time	Height	Area	2/1	3/1	dC13Pk
	191.1	3.77E-9	8.8306E-9	1.1793E-2	4.1702E-3	-32.44
	257.4	2.88E-9	7.8902E-9	1.1844E-2	4.1722E-3	-27.99
	349.8	3.23E-9	8.7038E-9	1.1798E-2	4.1711E-3	-28.43
	536.7	3.50E-9	8.2134E-9	1.1803E-2	4.1643E-3	-31.44

Figure 75. USADA0358. The delta C13 value for the second Mix Cal run is -31.44 It does *not* match the batch data report value of -31.68 shown in Figure 73.

CO2	Time	Height	Area	2/1	3/1	dC13Pk
	191.1	5.45E-9	1.2876E-8	1.1793E-2	4.1690E-3	-32.33
	257.7	4.25E-9	1.1751E-8	1.1845E-2	4.1702E-3	-27.81
	349.8	4.83E-9	1.3084E-8	1.1799E-2	4.1708E-3	-28.43
	536.3	5.46E-9	1.2814E-8	1.1806E-2	4.1655E-3	-31.22

Figure 76. USADA0359. The delta C13 value for the third Mix Cal run is -31.22 It does *not* match the batch data report value of -31.42 shown in Figure 73.

## **\*\*4I. Lack of Controls**

**ISL Violation<sup>156</sup>**  
**TD2003LDOC Violation**  
**TD2004EAAS Violation**

ISL 5.2.4.2.3:<sup>157</sup>

“All screening assays shall include negative and *positive controls* in addition to the Samples being tested.”

ISL 5.4.7.3:

Analytical performance should be monitored by operating quality control schemes appropriate to the type and frequency of testing performed by the Laboratory. The range of quality control activities includes:

- *Positive* and *negative controls* analyzed in the same analytical run as the Presumptive Adverse Analytical Finding Sample.
- The use of deuterated or other internal standards or standard addition.
- Comparison of mass spectra or ion ratios from selected ion monitoring (SIM) to a Reference Material or Reference Collection sample analyzed in the same analytical run.
- Confirmation of the ‘A’ and ‘B’ Split Samples.”

TD2003LDOC:<sup>158</sup>

The laboratory document package should contain:

“Confirmation procedure data on *negative, positive*, and all Athlete aliquots.” [Emphasis added.]

That is to say, control data must be included.

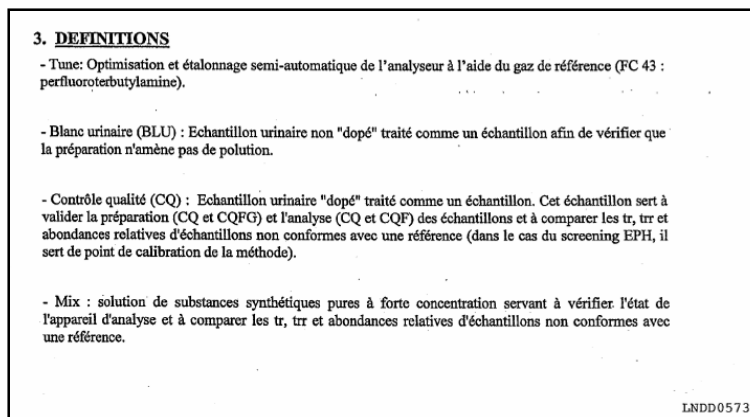
TD2004EAAS:<sup>159</sup>

“Appropriate calibration (e.g. calibration curve, deuterated standards, *quality control* samples) is to be included in the protocol of the confirmation Procedure.” [Emphasis added.]

### ***Control samples are crucial to laboratory quality.***

In addition to running the test sample, and standard concentration linearity runs, it is standard laboratory practice to run known controls: samples that are known negative and known positives—samples for which expected results are known.

This standard quality control measure helps assure that your machine and procedures are working properly, and that you are able to determine accurately what you are trying to measure.



**Figure 77. LNDD0573 confirms that a quality control is a sample of *urine*, treated as a sample.**

<sup>156</sup> For more on the significance of ISL and other violations, see page 16.

<sup>157</sup> WADA International Standard for Laboratories. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>158</sup> WADA TD2003LDOC. Laboratory Documentation Packages. 2, 3 (2003). [http://www.wada-ama.org/rtecontent/document/lab\\_docs\\_1\\_3.pdf](http://www.wada-ama.org/rtecontent/document/lab_docs_1_3.pdf). Accessed Dec 28, 2006.

<sup>159</sup> WADA TD2004EAAS. 2. (2004). Reporting and evaluation guidance for testosterone, epitestosterone, T/E ratio and other endogenous steroids. [http://www.wada-ama.org/rtecontent/document/end\\_steroids\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/end_steroids_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.

Linearity or calibration runs are performed on urines cleaned of steroids to which known concentrations of steroids are then added, for example testosterone and epitestosterone. These are used to show that the machine can measure target substances from the lower end to the upper end of expected possible results.

Control urines are matrixes that are more complex. They therefore present a more realistic test of the ability to successfully determine the amounts of the substances in question.

A quality control is a known positive or negative *urine* sample, *not* an artificial mix.

WADA has been exploring control standardization across all assays: Using the same known controls in all laboratories. Thus far, such harmonization across laboratories has *not* occurred.

However, that does not mean that controls should not be used within each laboratory. To the contrary:

According to WADA rules, the laboratory document package should contain “Confirmation procedure data on **negative, positive**, and all Athlete aliquots.” [Emphasis added.]<sup>160</sup> That is to say, control data must be included.

Bruce Goldberger’s comment:<sup>161</sup>

In my lab, every assay (qualitative or quantitative) includes a negative and positive control.

Paul Scott’s comment:

Positive and negative controls are run on every assay done at UCLA and not just on quantitative/semi-quantitative assays, but on every qualitative assay as well—including IRMS.

## GC/MS

### LNDD0573. USADA0084. USADA0272.

See Figure 77.

The laboratory defines BLU, blanc urinaire, as a non-doping (negative) urine sample.

The laboratory defines CQ, contrôle qualité, as a doping (positive) urine sample.

CQ (positive control samples) are listed at the end of the sequence files in the testosterone/epitestosterone test performed by GC/MS. Their values are never reported.

TD2004EAAS: “Appropriate calibration (e.g. calibration curve, deuterated standards, **quality control** samples) is to be included in the protocol of the confirmation Procedure.” [Emphasis added.]<sup>162</sup>

The use of such controls is standard practice at the UCLA laboratory.

The need for the use of such controls is implicit in a letter from WADA Science director Olivier Rabin to LNDD Director Jacques de Ceaurriz (LNDD0488) in which Rabin asks for the chromatograms of the negative and positive controls in a sample cross-contaminated and erroneously reported as positive.

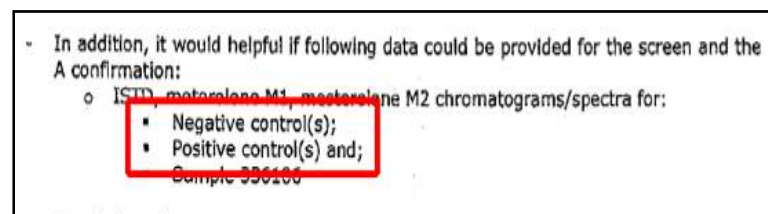


Figure 78. LNDD0488. The laboratory is asked to provide chromatograms for its negative and positive controls. Such controls were not part of Landis’s document package.

<sup>160</sup> WADA TD2003LDOC. Laboratory Documentation Packages. 2, 3 (2003). [http://www.wada-ama.org/rtecontent/document/lab\\_docs\\_1\\_3.pdf](http://www.wada-ama.org/rtecontent/document/lab_docs_1_3.pdf). Accessed Dec 28, 2006.

<sup>161</sup> A list of Landis’s experts and their credentials is found starting on page 357.

<sup>162</sup> WADA TD2004EAAS. 2. (2004). Reporting and evaluation guidance for testosterone, epitestosterone, T/E ratio and other endogenous steroids. [http://www.wada-ama.org/rtecontent/document/end\\_steroids\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/end_steroids_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.



## IRMS

### LNDD0573. USADA0129. USADA0308.

See Figure 77.

There is no evidence that the analysts used positive control samples in the carbon isotope test performed by GC/C-IRMS.

Indeed, the development of inter-laboratory controls for IRMS testing (as for other assays) has been suggested for years by WADA and USADA researchers.<sup>163, 164</sup> (See also Figure 79, Figure 80, and Figure 81.)

No such inter-laboratory controls have ever been developed. Nonetheless, intra-laboratory controls remain crucial.

***The so-called LNDD positive control is a mix that does not contain 5-alpha androstanediol. It does not contain androsterone. It does not contain pregnanediol.***

***It cannot be considered a positive control.***

#### Peer-Reviewed Papers

“Each batch includes positive (QC-Pos) and negative (QC-Neg) quality controls and the measurements are performed for all metabolites in the linear range of the IRMS. The purpose of the quality controls is to verify the reproducibility of the extraction procedure and the GC–C–IRMS measurements.”<sup>165</sup>

“Each batch included positive (QC-Pos) and negative (QC-Neg) quality controls and the measurements were performed in the linear range of the IRMS.”<sup>166</sup>

“QC and precision studies were performed on two urine samples, designated negative QC (Neg-QC) and positive QC (Pos-QC).”<sup>167</sup>

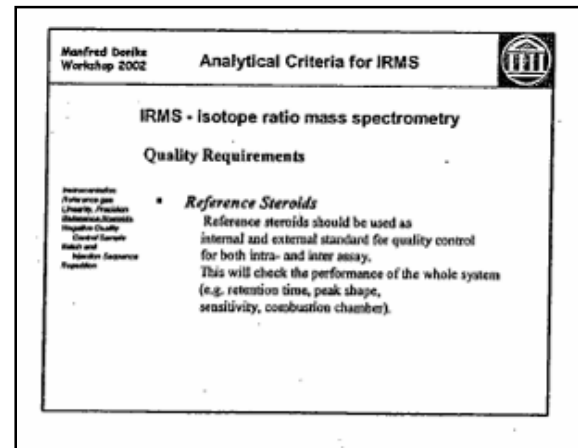


Figure 79. USADA0735. From the Manfred Donike Workshop (2002). Quality requirement. Reference steroids should be used as internal and external standards for quality control.

<sup>163</sup> Manfred Donike Workshop (2002). Analytical Criteria for IRMS. USADA0735, USADA0736, and USADA0737. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>164</sup> 2<sup>nd</sup> Annual USADA Symposium on Anti-Doping Science. Application of Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry to Doping Control. Los Angeles. Page 106. (2003). USADA0851. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>165</sup> Maitre A, et al., Urinary analysis of four testosterone metabolites and pregnanediol by gc-cims after oral administrations of testosterone. J Anal Toxicol. 28, (2004). Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>166</sup> Baume N, et al. Use of isotope ratio mass spectrometry to detect doping with oral testosterone undecanoate: inter-individual variability of <sup>13</sup>C/<sup>12</sup>C ratio. Steroids. 75:369. (2006). USADA0806. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>167</sup> Aguilera R, Hatton CK, Catlin DH, Detection of epitestosterone doping by isotope ratio mass spectrometry. Clin Chem. 48(4):631. (2002). <http://www.clinchem.org/cgi/reprint/48/4/629>. Accessed May 1, 2007.





**\*\*4J. Variation in Negative Control Values  
Differences in Concentrations Unexplained**

The same negative control urine (blu01 H1) was used in all of Landis's Tour samples.

The variation in the absolute concentration of the analytes in these examinations is unexplained.

<b>Bates</b>		<b>Andro</b>	<b>S</b>	<b>A</b>	<b>E</b>	<b>5α</b>	<b>5β</b>	<b>P</b>	<b>DHEA</b>	<b>E</b>	<b>T</b>	<b>THC</b>	<b>S</b>	<b>Etio</b>	<b>THS</b>	<b>THF</b>	<b>C</b>	<b>Keto</b>
LNDD0116	04blu01 H1	103	96	2535	1489	65	81	370	56	45	32	3	-45	142	5	1878	93	171
LNDD0119	12blu01 H1	687	143	526	329	21	28	0	10	13	7	0	-45	33	11	467	11	54
LNDD0122	15blu01 H1	164	47	1722	546	23	24	217	19	8	20	0	-45	0	31	1134	56	37
LNDD0125	20blu01 H1	833	110	1304	679	35	52	211	20	27	25	0	-45	65	24	617	0	55
LNDD0128	21blu01 H1	798	194	510	381	0	23	0	10	9	8	0	-45	43	14	355	0	49
LNDD0133	23blu01 H1	875	144	1054	501	23	33	114	18	8	9	0	-45	270	20	725	20	63
LNDD0134	24blu01 H1	965	66	1646	805	41	81	297	23	16	21	0	-45	184	36	995	38	115

**Table 11. Reference urine (blank urine) metabolite values in nanograms per milliliter.**

Arnie's comment:

If these are all from the same blank urine pool, why are the values so different each time they tested?

## **\*\*4K. Lack of Replicates**

### **TD2004EAAS Violation<sup>168</sup>**

*Repeated results are characteristic of quality laboratory work.*

TD2004EAAS:<sup>169</sup>

“Confirmation of elevated T/E values, concentration of testosterone, epitestosterone... is to be performed in triplicate.”

Running a positive result several times is necessary whenever important decisions about positivity are to be made.

In medicine, important decisions are almost never based on a single test result. The decision to treat a patient for high blood pressure is usually made on three readings taken on three separate office visits. The decision to diagnose or treat a patient for diabetes, heart disease, or cancer, requires confirmation.

Similarly, anti-doping tests need confirmation.

- The ideal procedure is to prepare each repeat test from scratch, in a separate batch,<sup>170</sup> perhaps on a different day.
- Less than ideal is to run a separate aliquot in the same batch.
- The least reassuring method is to run a repeat measurement of the same aliquot.
- If no replicates are run, the results are suspect.

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<sup>168</sup> For more on the significance of ISL and other violations, see page 16.

<sup>169</sup> WADA TD2004EAAS. 2. (2004). Reporting and evaluation guidance for testosterone, epitestosterone, T/E ratio and other endogenous steroids. [http://www.wada-ama.org/rtecontent/document/end\\_steroids\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/end_steroids_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.

<sup>170</sup> The athlete's urine is split into an 'A' and a 'B' samples. Portions of these samples are called aliquots. Aliquots processed at the same time, in a series of tests, are in the same batch.

## ***T/E Testing***

For T/E ratios, WADA rules require three confirmation tests for each sample in order to call it positive.

In Landis's 'A' sample, replicates were unsatisfactory. Only two confirmation samples were run.

These two confirmation runs had widely different absolute testosterone and epitestosterone values—values so far apart as to invalidate the testing—even though the T/E ratios were similar.

In the 'B' sample, replicates were less than ideal. Three confirmation runs were made on the same batch.

Since the testing of the 'A' sample did not meet the WADA requirements for a positive T/E test, the 'B' sample cannot confirm a positive test.

## ***IRMS Testing***

For IRMS testing, a relatively large urine volume is required for the androstanediol test, but not for androsterone/etiocholanolone test.

Laboratory quality should not be compromised, and the athlete should not be penalized, because of the limitation of the diol assay.

Although there is no WADA rule about repeat testing, the Manfred Donike workshop criteria state that the sample be injected twice.<sup>171</sup>

“Repetition: A single sample preparation and a minimum of two injections for each sample are applied.”

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<sup>171</sup> Manfred Donike Workshop (2002). Analytical Criteria for IRMS. USADA0737. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

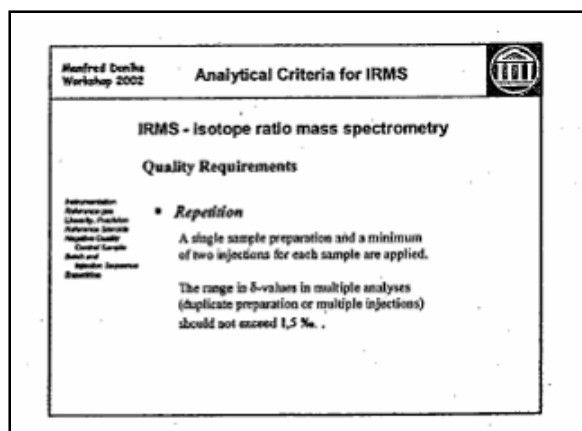


Figure 83. USADA0737. From the Manfred Donike Workshop (2002). Quality requirement: "...a minimum of two injections for each sample are applied."

In Landis's IRMS, no replicates were run, meaning that the results are suspect.

Arnie's comment:

A lack of replicates remains a failure of laboratory quality.

## **\*\*4L. Contamination/Degradation**

### **WADA and LNDD Criteria**

**ISL Violation<sup>172</sup>**

**TD2004EAAS Violation**

TD2004EAAS:<sup>173</sup>

“The urine Sample is not collected under sterile conditions, and where the circumstances are favourable, the microbes present in the Sample can cause changes to the profile of the urinary steroids. Initially there is cleavage of the glucuronides and sulfates followed by modifications of the steroids’ structure by oxido-reductive reactions. To report an Adverse Analytical Finding of an elevated T/E value, testosterone or epitestosterone concentration or any other endogenous steroid parameters, the concentration of free testosterone and/or epitestosterone in the specimen is not to exceed 5% of the respective glucuroconjugates.”

#### ***Degradation Invalidates T/E Testing***

Contamination or degradation (breakdown) in the urine is a well-known problem creating difficulties in accurately evaluating urine for the T/E ratio. It is often ascribed to bacteria.

Almost all testosterone and epitestosterone is bound to other chemicals in the urine—principally glucuronides.

With bacteria breakdown, bound testosterone or bound epitestosterone is released and forms free testosterone or free epitestosterone respectively.

***The level of free epitestosterone in Landis’s ‘B’ sample exceeds the 5% threshold. See Table 12.***

When bacterial activities in the urine are present, “the steroid profile parameters are worthless.”<sup>174</sup>

“The lowering of the T/E threshold value from 6 to 4 imposes a careful examination of potential markers of urine degradation.”<sup>175</sup>

	<b>T</b>	<b>E</b>	
USADA0288	61.7	5.7	With hydrolysis
USADA0283	1.22	0.44	Without hydrolysis
Ratio SSH/H	2.0%	<b>7.7%</b>	

**Table 12. The concentration of free epitestosterone to its glucuroconjugates value is 7.7%. This exceeds WADA guidelines of 5.0%.**

**Arnie’s comment:**

Since the epitestosterone in the sample without hydrolysis (free) is 7.7% of the glucuroconjugates, the sample cannot be reported as adverse. The specimen was mishandled or contaminated.

#### ***Testosterone and Epitestosterone Contamination Underestimated***

‘A’ sample

Testing for unhydrolyzed testosterone and epitestosterone occurred on July 22, with the first ‘A’ sample confirmation (USADA0214.)

There was no further testing with the second confirmation on July 24, 2006 (USADA0084).

*It is unknown what the degree of degradation was with the second ‘A’ sample confirmation.*

<sup>172</sup> For more on the significance of ISL and other violations, see page 16.

<sup>173</sup> WADA TD2004EAAS. 2. (2004). Reporting and evaluation guidance for testosterone, epitestosterone, T/E ratio and other endogenous steroids. [http://www.wada-ama.org/rtecontent/document/end\\_steroids\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/end_steroids_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.

<sup>174</sup> Geyer H., et al. The Cologne protocol to follow up high testosterone/epitestosterone ratios. RADA (4). Proceedings of the 14th Cologne Workshop on Dope Analysis. Donike, M., et al, eds. 113. (1997). <http://proceedings.pulse180.de/>. Accessed Mar 1, 2007.

<sup>175</sup> Molaioni, F., et al. Urine stability, steroid profile and T/E ratio: towards an index of sample degradation. RADA (13). Proceedings of the Cologne Workshop on Dope Analysis. 187. (2006). <http://proceedings.pulse180.de/>. Accessed Mar 1, 2007.

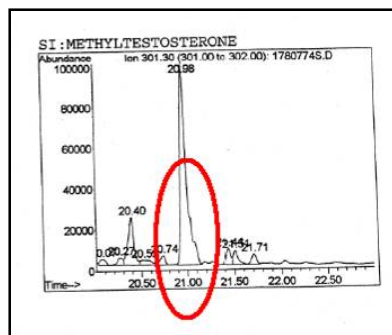
'B' sample

See Figure 84 below.

The methyltestosterone chromatogram on USADA0284 has two right shoulders.<sup>176</sup> The target response of methyltestosterone may be overestimated. This matrix interference,<sup>177</sup> discussed below, is an ISL violation in itself.

Since methyltestosterone is assigned a concentration of 100 ng/mL, the amount of testosterone may be correspondingly underestimated.

Therefore, the concentration of free testosterone and epitestosterone may be much higher than reported. Therefore, the ratio of free testosterone or epitestosterone to total (conjugated) testosterone and epitestosterone may be higher than reported and the specimen may be degraded by WADA criteria.



**Figure 84. USADA0284. 'B' sample. Methyltestosterone, the internal reference, has two right shoulders. This matrix interference may lead to an underestimation of the amount of free testosterone and epitestosterone present, and so underestimate the degradation of the sample.**

<sup>176</sup> For the significant of shoulders on chromatogram peaks, see *Test Procedures and Problems*, beginning on page 313

<sup>177</sup> For more on matrix interference, see page 155.

Arnie's comment:

This bad chromatography may have seriously underestimated the degree of contamination and have led to an adverse analytical finding when the sample should have been discarded.

### **Matrix Interference in Degradation Testing**

#### **ISL Violation<sup>178</sup>**

ISL 5.4.4.2.1:<sup>179, 180</sup>

“Matrix interferences. The method must avoid (non-threshold) or limit (threshold) interference in the detection of *Prohibited Substances* or their *Metabolites or Markers* by components of the sample matrix.

In Landis's sample 995474, matrix interference was common. (For more documentation about this, see pages 155 and 197.)

As discussed on page 16, according to WADA rules, the laboratory must prove that these errors did not lead to a faulty conclusion.<sup>181, 182</sup>

I do not believe that this is possible.

<sup>178</sup> For more on the significance of ISL and other violations, see page 16.

<sup>179</sup> WADA International Standard for Laboratories. 5.4.4.2.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>180</sup> For more on matrix interference, see page 155.

<sup>181</sup> WADA International Standard for Laboratories. Page 7.

<sup>182</sup> WADA World Anti-Doping Code 1. (2003). 3.2.1 and 3.2.2 [http://www.wada-ama.org/rtecontent/document/code\\_v3.pdf](http://www.wada-ama.org/rtecontent/document/code_v3.pdf). Accessed Dec 28, 2006.

### LNDD argument:

The laboratory wrote to the AFLD that the free epitestosterone value was low and below or near the limits of quantification. They added that the free T to total T ratio ( $T_F/T_T$ ) was fine.

### Rebuttal arguments:

1. The matrix interference discussed above means that the epitestosterone values may well have been above the limits of quantification.
2. Although the epitestosterone value in the unhydrolyzed specimen is low, the laboratory apparently had no difficulty in determining its value and reporting it to two significant digits.
3. The standard laboratory practice, where calculations of this sort are unreliable, is to note such a problem or report that the value cannot be calculated.
4. If the laboratory felt it had a problem assessing the validity of the unhydrolyzed testosterone reading, it could have determined a more accurate value by changing the machine settings. It chose to use a dwell (sampling time) of 50 (USADA0267), when its machine was capable of a dwell of 10 (USADA0046).

Further, both of these dwells are listed with an associated low resolution. The laboratory apparently had the ability to use a higher resolution.

5. If the laboratory felt it had a problem assessing the validity of the unhydrolyzed testosterone reading, it could have determined a more accurate value by using HRMS.
6. A subjective or interpretive argument... after the fact, when an objective report has already been made, is troubling.

7. The rule is: "...the concentration of free testosterone and/or epitestosterone in the specimen is not to exceed 5% of the respective glucuroconjugates."

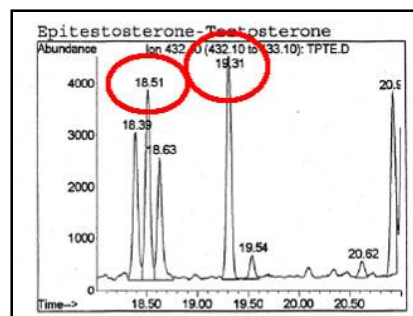
The laboratory cannot show that this was not the case.

Therefore, an adverse analytical finding cannot be reported.

8. The peaks for 2 ng/mL were quite high—well above baseline, easily measured. Peaks one-quarter as high would also be easily measurable. (See Figure 85.)

Note also:

9. There are many measures of degradation. Relying on any one measure, such as pH or  $T_F/T_T$  results in errors. *Any* measure is sufficient to show contamination.



**Figure 85. USADA0292. The 2 ng/mL peaks for epitestosterone (left) and testosterone (right), as identified by the LNDD, were well above baseline and easily measured.**



### IRMS Test Also Out

The WADA document reads: “To report an Adverse Analytical Finding of an elevated T/E value, testosterone or epitestosterone concentration *or any other endogenous steroid* parameters...”<sup>183</sup>

Arnie’s comment:

Since 5 $\beta$  Pdiol used in the IRMS test is an endogenous urinary reference, I read this as meaning that the IRMS test is also out.

There is insufficient scientific literature to form a judgment as to whether or not contamination/degradation changes IRMS values.

That the validity of IRMS testing is uncertain is confirmed by Taylor,<sup>184</sup> published after the WADA Technical Document TD2004EAAS:

“Decomposed samples no longer have steroid profile values that can be representative of the originally collected urine due to steroid interconversions and metabolism by microorganisms. It has been proposed that carbon isotope ratio measurement made by GC/C-IRMS of the urinary residual androsterone and etiocholanolone *may* alleviate issues associated with the accurate measurement of the T/E ratio.” [Emphasis added.]

In Taylor’s brief and incomplete report, androsterone and etiocholanolone were studied. *The diols were not examined.*

Arnie’s comment:

In other words: “We don’t yet know the effect of bacterial degradation on IRMS values.”

Simon Davis’s comment:

“I would strongly agree that the CIR test can result in a false positive if bacterial activity is present. Bacteria always act in an energy-efficient manner and will therefore metabolize molecules with lower masses. As such bacteria will metabolize a T conjugate with more <sup>12</sup>C atoms in preference to one with more <sup>13</sup>C (as it requires less energy to do this). This process is known as fractionation, and could potentially result in an isotopic shift which would be mistaken for a positive analysis.”

Note: Bacteria eating <sup>12</sup>C would shift isotopic values of metabolites to less negative values. However, the combined effect on the metabolite and the ERC (the subtraction value) is unknown and unpredictable.

	-22‰	-28‰
Weight	Heavier	Lighter
<sup>12</sup> C	Less	More
<sup>13</sup> C	More	Less
Degradation	Shifts values to less negative	

Table 13. Isotopic differences and effect of degradation.

<sup>183</sup> WADA TD2004EAAS. 2. (2004). Reporting and evaluation guidance for testosterone, epitestosterone, T/E ratio and other endogenous steroids. [http://www.wada-ama.org/rtecontent/document/end\\_steroids\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/end_steroids_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.

<sup>184</sup> Taylor, R., et al. Validity of carbon isotope ratio measurements for decomposed urine samples. RADA (12). Proceedings of the Cologne Workshop on Dope Analysis. 491. (2005). <http://proceedings.pulse180.de/>. Accessed Mar 1, 2007.

## pH Test

### LNDD0533. USADA0079.

According to LNDD's own SOP, I-TE-03, pH is supposed to be measured before every new confirmation.

• **En confirmation / contre expertise :**

Le pH est mesuré au pH mètre (cf. I-N-08B).

Le pH doit systématiquement être contrôlé à chaque nouvelle confirmation. Afin d'éviter de gaspiller de l'urine, l'analyste, qui a décongelé l'échantillon pour la première fois et homogénéisé celui-ci, doit prélever 2 mL dans un tube identifié par le numéro de série et le numéro échantillon. Ce tube est ensuite accouplé LNDD0533

Figure 86. According to LNDD's own SOP, pH must be measured before every confirmation. It was *not* measured before the second 'A' sample confirmation.

In the second confirmation of the 'A' sample, it was not measured. Instead, the analyst relied on a value obtained the previous day, a value recorded for the first, failed, 'A' sample confirmation.

LNDD		ENREGISTREMENT		Codification : E-TE-03A Version : M Date : 13/09/2005	
FICHE DE SUIVI DES ALIQUOTES POUR LA CONFIRMATION / CONTRE EXPERTISE EN GC					
Echantillon : 19814 95474		Mode opératoire d'extraction : NBX048			
Date	Appareil	Température en °C	Valeur affichée	Densité	
200703	pHmet n° 7	22.2	5.22	1.02	
200703	Refract n° 2		1.025	1.02	
Date de mise à l'ambient de l'échantillon : 200706		Heure de mise à l'ambient : 14h30			

Figure 87. Cerpolini, (initials EC) corrects the notations of Cariou (initials appear to be RE), because she was the analyst who obtained the pH value during the first 'A' sample T/E confirmation, on July 22, 2006.

Allowing that another day had passed in which it might further spoil, the urine should have been retested—according to the LNDD's own SOP.

WADA: "Samples showing indications of bacterial activity (pH higher than 7.0 and presence of 5-alpha or 5-beta androstandione) should be excluded from the data set of a longitudinal study."<sup>185</sup>

#### Arnie's comment:

Due to this failure to follow procedure, according to WADA rules, the LNDD must prove a negative: It must show that their failure to follow procedure did not result in contamination.

The LNDD cannot show that the pH value did not rise with contamination.

This failure must dismiss any T/E results as unreliable.

<sup>185</sup> WADA Guideline Reporting and Management of Elevated T/E Ratios, 8. (2006). <http://www.wada-ama.org/rtecontent/document/GuidelineReportingManagementElevatedTERatios.pdf>. Accessed Dec 28, 2006.

### ***Diones Test***

WADA: “Samples showing indications of bacterial activity (pH higher than 7.0 and presence of 5-alpha or 5-beta androstandione) should be excluded from the data set of a longitudinal study.”<sup>186</sup>

Arnie’s comment:

There is no report that the diones were measured and evaluated.

Arnie’s comment:

pH testing alone is unreliable. Although bacteria may raise pH, degradation is well-known without a pH rise. A rise in pH is strongly linked to urease activity. Other contaminants can also degrade urine without raising the pH.

“Alkalization of urinary pH is *not* a good indicator of urine contamination as several micro-organisms can grow in this medium without any noticeable alteration of this parameter.” “Many micro-organisms (do) not induce significant changes in urinary pH but several metabolic changes, including de-conjugation of glucuronides and sulphates, in the endogenous steroid profile.”<sup>187</sup>

Free/total glucuroconjugates and dione testing should be routine and reported on a contamination report form in the document package.

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<sup>186</sup> WADA Guideline Reporting and Management of Elevated T/E Ratios, 8. (2006). <http://www.wada-ama.org/rtecontent/document/GuidelineReportingManagementElevatedTERatios.pdf>. Accessed Dec 28, 2006.

<sup>187</sup> de la Torre, R., et al. Urine Contamination by micro-organisms and alterations in the endogenous steroid profile. A Prospective study. RADA (6). Proceedings of the Cologne Workshop on Dope Analysis. 227. (1999). <http://proceedings.pulse180.de/>. Accessed Mar 1, 2007.

## \*\*4M. Procedures Wrongly Verified

The LNDD uses a mandated quality control measure: It employs a verifying analyst to confirm the work of the sample operator.

However, on some verified summary pages, it is clear that the verifying analyst has certified that a procedure has been performed that is at odds with other documentation.

Batch Data Processing Results

Data File Name : 230706  
Labor Setup File Name : 230706  
Analysis Date : 23/07/06  
Background Subtraction : Disabled  
Reference Gas : Krypton-86  
Ref Gas Delta (C13) : -34.50  
Ref Gas Delta (C18) : -19.30  
Current Time : 21:23:49  
Current Date : 23/07/06

No.	Sample Details	Weight (mg)	Ref Type	Elemental Isotopic (C)	% Comp (C13)	Delta (C13)	(O18)
1	stabilite 1	0.000	Sam				
2	stabilite 2	0.000	Sam				
3	stabilite 3	0.000	Sam				
4	Mix cal IRMS 003-1	0.000	Sam			-31.51	-42.1
5	Mix cal IRMS 003-2	0.000	Sam			-32.22	-39.5
6	Mix cal IRMS 003-3	0.000	Sam			-31.59	-40.3
7	Mix cal Acetate 001A-100mg inj	0.000	Sam				
8	Blu 1 pool 4 F3/45ul inj 2ul	0.000	Sam				
9	178/07 995474 F3/45ul inj 2ul	0.000	Sam				
10	Blu 1 pool 4 F1/50ul inj 1ul	0.000	Sam				
11	178/07 995474 F1/50ul inj 1ul	0.000	Sam				
12	Blu 1 pool 4 F2/400ul inj 1ul	0.000	Sam				
13	178/07 995474 F2/400ul inj 1ul	0.000	Sam				
14	Mix Cal Acetate 001A-2	0.000	Sam			-25.21	

Sequence vérifiée par : 49  
Remarques :  
USADA 0155 144

Figure 88. USADA0155. Batch data processing results for 'A' sample IRMS. Red boxes: Mongongu, Operator 49, signs off that all vials in the batch were analyzed with background subtraction disabled. Green box: Last two vials in the batch sequence are analyzed with a significant time gap: Discussed on page 123.

Data Processing Results

Data File Name : DATA\_004  
Folder : 230706  
Sample Name : Mix cal IRMS 003-1  
Sample ID : 1  
Sample Position : 1  
Injection Size : 0.0000  
Sample Type : Gas  
Method : M-AN-38  
Batch Name : 230706  
RunTime User : microman  
Acquisition Time : 10:01:53 Date : 23/07/06  
Current Time : 10:17:37 Date : 23/07/06

Analysis of Reference Gas Data  
Ref Delta 13 : -34.50 Ref Delta 18 : -19.30

Time	Major	Ratio 2/1	Ratio 3/1
42.6	8.564E-8	1.1782E-2	4.2512E-3
122.6	8.610E-8	1.1782E-2	4.2508E-3
242.6	8.466E-8	1.1782E-2	4.2508E-3
362.6	8.551E-8	1.1782E-2	4.2508E-3

Std Dev Of Fit : 1.4024E-7 2.0412E-7

Analysis of Sample Peaks with Zero Subtraction

CO2	Time	Height	Area	2/1	3/1	dC13PK	dC18PK
	150.1	5.97E-8	1.5080E-8	1.1797E-2	4.1720E-3	-39.52	-37.68
	243.7	4.68E-8	1.5470E-8	1.1844E-2	4.1873E-3	-38.45	-38.06
	347.0	4.95E-8	1.5485E-8	1.1803E-2	4.1717E-3	-31.06	-37.68
	343.3	6.98E-8	1.4732E-8	1.1894E-2	4.1849E-3	-31.51	-41.13

Figure 89. USADA0178. The 'A' sample calibration mix was run with background subtraction disabled (zero subtraction).

Data Processing Results

Data File Name : DATA\_007  
Folder : 230706  
Sample Name : Mix cal Acetate 001A-100mg inj  
Sample ID : 2  
Sample Position : 2  
Injection Size : 0.0000  
Sample Type : Gas  
Method : M-AN-41  
Batch Name : 230706  
RunTime User : microman  
Acquisition Time : 10:53:36 Date : 23/07/06  
Current Time : 11:35:17 Date : 23/07/06

Analysis of Reference Gas Data  
Ref Delta 13 : -34.50 Ref Delta 18 : -19.30

Time	Major	Ratio 2/1	Ratio 3/1
122.6	8.609E-8	1.1781E-2	4.2522E-3
182.6	8.610E-8	1.1781E-2	4.2522E-3
242.6	8.610E-8	1.1781E-2	4.2522E-3
302.6	8.609E-8	1.1781E-2	4.2518E-3
362.6	8.488E-8	1.1781E-2	4.2516E-3
422.6	8.528E-8	1.1782E-2	4.2520E-3

Std Dev Of Fit : 1.7125E-7 1.7134E-7

Analysis of Sample Peaks with Background Subtraction

CO2	Time	Height	Area	2/1	3/1	dC13PK	dC18PK	dC18PK
	846.6	4.79E-9	2.5879E-8	1.1821E-2	4.1654E-3	-30.29	-68.47	-38.32
	1239.9	4.79E-9	2.7702E-8	1.1782E-2	4.1686E-3	-20.01	-66.76	-39.05
	1302.2	3.43E-9	2.8202E-8	1.1782E-2	4.1686E-3	-34.75	-66.84	-38.08
	1473.9	3.17E-9	2.3294E-8	1.1770E-2	4.1685E-3	-16.69	-66.30	-39.06

Figure 90. USADA0181. The 'A' sample acetate calibration mix was run with background subtraction enabled.

Wolfram Meier-Augenstein's comment:

Procedures must not be altered or amended after they have been signed off. Any changes, deviation, or interruptions must be recorded, explained, dated, and initialed.

Which document is to be believed? USADA0155 or USADA0181?

Note also: The samples received unequal treatment. The principle of identical treatment is described on page 123.

**\*\*4N. Reference Solution Errors**

Bates No	Substance	Code	Concentration	Corrected To	Corrected To	Reported	Bates No	Error
<b>USADA0079</b>	Methyltestosterone	SI3-046?	4 or 6 ng/μL?	4 mg/L		8 mg/L	LNDD0263	<b>X1-1/2 or 2</b>
	Epitestosterone	H7-032	1 ng/μL	1 μg/mL	0.001 mg/mL	1 mg/mL	LNDD0269	<b>x1,000</b>
	Epitestosterone	H7-032	1 ng/μL	1 μg/mL	0.001 mg/mL	1 mg/mL	LNDD0269	<b>x1,000</b>
	Epitestosterone	H7-033	10 ng/μL	10 μg/mL	0.01 mg/mL	1 mg/mL	LNDD0269	<b>x100</b>
	Epitestosterone	H7-032	10 ng/μL	10 μg/mL	0.01 mg/mL	1 mg/mL	LNDD0269	<b>x100</b>
	Testosterone	H10-034	1 ng/μL	1 μg/mL	0.001 mg/mL	0.1 mg/mL	LNDD0267	<b>x100</b>
	Testosterone	H10-034	10 ng/μL	10 μg/mL	0.01 mg/mL	0.1 mg/mL	LNDD0267	<b>x10</b>
	Testosterone	H10-035	100 ng/μL	100 μg/mL	0.1 mg/mL	0.1 mg/mL	LNDD0267	<b>OK</b>
	Testosterone	H10-034	100 ng/μL	100 μg/mL	0.1 mg/mL	0.1 mg/mL	LNDD0267	<b>OK</b>
<b>USADA0200</b>	Methyltestosterone	SI3-046	4 mg/L	4 mg/L		8 mg/L	LNDD0263	<b>x2</b>
	Epitestosterone	H7-033	1 ng/μL	1 μg/mL	0.001 mg/mL	1 mg/mL	LNDD0269	<b>x1,000</b>
	Epitestosterone	H7-032	1 ng/μL	1 μg/mL	0.001 mg/mL	1 mg/mL	LNDD0269	<b>x1,000</b>
	Epitestosterone	H7-033	10 ng/μL	10 μg/mL	0.01 mg/mL	1 mg/mL	LNDD0269	<b>x100</b>
	Testosterone	H10-035	1 ng/μL	1 μg/mL	0.001 mg/mL	0.1 mg/mL	LNDD0267	<b>x100</b>
	Testosterone	H10-034	10 ng/μL	10 μg/mL	0.01 mg/mL	0.1 mg/mL	LNDD0267	<b>x10</b>
	Testosterone	H10-031	10 ng/μL	10 μg/mL	0.01 mg/mL	0.1 mg/mL	LNDD0265	<b>x10</b>
<b>USADA0264</b>	Methyltestosterone	SI3-046-7	4 mg/L			4 mg/L	LNDD0440	<b>????</b>
	Epitestosterone	H7-032-1-1	1 ng/μL	1 μg/mL	0.001 mg/mL	0.001 mg/mL	LNDD0269	<b>OK</b>
	Epitestosterone	H7-033-1-1	1 ng/μL	1 μg/mL	0.001 mg/mL	0.001 mg/mL	LNDD0439	<b>OK</b>
	Epitestosterone	H7-032-2	10 ng/μL	10 μg/mL	0.01 mg/mL	0.01 mg/mL	LNDD0269	<b>OK</b>
	Epitestosterone	H7-033-2	10 ng/μL	10 μg/mL	0.01 mg/mL	0.01 mg/mL	LNDD0439	<b>OK</b>
	Testosterone	H10-035-2	1 ng/μL	1 μg/mL	0.001 mg/mL	0.001 mg/ml	LNDD0438	<b>OK</b>
	Testosterone	H10-034-1	10 ng/μL	10 μg/mL	0.01 mg/mL	0.01 mg/mL	LNDD0267	<b>OK</b>
	Testosterone	H10-035	100 ng/μL	100 μg/mL	0.1 mg/mL	0.1 mg/mL	LNDD0267	<b>OK</b>
	Testosterone	H10-034	100 ng/μL	100 μg/mL	0.1 mg/mL	0.1 mg/mL	LNDD0267	<b>OK</b>

**Table 14. Reference-solution concentration errors, based on USADA0079, USADA0200, and USADA0264 vs. LNDD records beginning LNDD0263.**  
**(1 gram = 1 g) = (1,000 milligrams = 1,000 mg) = (1,000,000 micrograms = 1,000,000 μg) = (1,000,000,000 nanograms = 1,000,000,000 ng).**  
**For discussion, see the next page.**

### ***Reference Solution Errors Discussion***

There are many errors in the documentation of reference solution concentrations. The handwritten values are sometimes difficult to read.

Errors based on values reported in LNDD reference solution documentation starting LNDD0263 are given in the last column of Table 14.

Even without knowing the concentrations of the reference solutions, sets of the same solution, with different stated concentrations (highlighted values sets) must represent errors. For example, H7-032 cannot be *both* 1 nanogram per milliliter and 10 nanograms per milliliter.

Importantly, the concentration of reference solution methyltestosterone is reported at three locations in the document package (allowing for handwriting interpretation) as 4 or 6 ng/μL. This substance is used as an internal reference standard. According to LNDD0263, the concentration of this solution for S13-046 is 8 mg/L (or 8 ng/μL). This error could result in a doubling of the absolute concentrations of values measured.

There is a question of rewritten/remanufactured documents on LNDD0440. See page 42 for more discussion.

## **\*\*40. Lab Knew it Was Landis Blinding is a Sham**

### ***Blinding is an implicit and explicit part of the testing process.***

According to the WADA Guidelines for Urine Sample Collection: “Documentation identifying the Athlete shall not be included with the samples.”<sup>188</sup>

“The laboratory should not know the identity of the testee, therefore urine samples are forwarded to the laboratory identified only by a number.”<sup>189</sup>

Claire Frelat, in testing the ‘B’ sample:

Q. So you’re saying that when you did this test, you knew that the IRMS test that was being done on this sample was Floyd Landis’?

A. “Yes, the B; yes, I did know that.”<sup>190</sup>

### ***Pereiro Provides Proof Lab Knew from the Start***

According to a cyclingnews.com interview:<sup>191</sup>

“Two days after the end of the Tour, Pereiro received the news that transformed his life and rocked the world of cycling. The result of the urine test Landis had provided after his epic ride had been released; the American was positive for testosterone.

‘It was the Tuesday after the Tour when I heard,’ he told *Cycling News* at the recent Caisse d’Epargne team training camp in Mallorca. ‘I was not happy to hear that because at the start of the Tour, cycling

was going through a lot because of *Operación Puerto*. Once the race got going people were very happy with the Tour again.’

The Tour finished Sunday, July 23, 2006.

Tuesday was July 25, 2006. The laboratory was still conducting its analysis on that day.

The UCI sent out letters on July 26, 2006 (USADA0372).

How did Pereiro know it was Landis before the UCI, unless the LNDD itself did—and leaked it?

Furthermore, the laboratory was leaking info even earlier than July 25, 2006. Pereiro knew even before the finish of the Tour that a top-10 rider was under suspicion.

Denise Demir (Phonak team physician) comment:

“...[T]his is not written anywhere, but Oscar knew already at the finish line in Paris (July 23), that one of the top ten was positive, long way before the lab knew for sure!!! Oscar told exactly this to one of our mechanics, who witnessed that to me and Monika Zürcher.”

If the laboratory knew anything about the identity of the rider, then it certainly knew it was Landis.

### ***Anecdote***

Also from Denise Demir: “Jean Marie Leblanc called Lelange and told him to release the name of the rider associated with the positive doping test or it would be leaked.”

How did Leblanc know? Why was there going to be a leak?

## **USADA0021. USADA0228.**

The recording of declared drugs on the Doping Control Form allows identification of the athlete. Even though his name was redacted, the laboratory procedures allow easy identification by noting his corticosteroid therapeutic use exemption.

The document package also allows the identity and partial results of the two other riders tested on Stage 17 to be determined.

<sup>188</sup> WADA Guidelines for Urine Sample Collection (2004). 5.14.6. [http://www.wada-ama.org/rtecontent/document/urine\\_testing\\_guideline.pdf](http://www.wada-ama.org/rtecontent/document/urine_testing_guideline.pdf). Accessed Jan 18, 2007.

<sup>189</sup> Catlin, Cowan, Donike et al., “Testing Urine for Drugs,” International Federation of Clinical Chemistry (1992), Exhibit GDC02 19-0232. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>190</sup> AAA official arbitration transcript. p. 718, line 3. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>191</sup> Cyclingnews. The long wait. Feb 27, 2007. [http://www.cyclingnews.com/riders/2007/interviews/?id=oscar\\_pereiro07](http://www.cyclingnews.com/riders/2007/interviews/?id=oscar_pereiro07). Accessed Feb 28, 2007.



Arnie's comment:

Laboratory blinding to sample identification is a known important step not only in drug testing, but in all scientific work.

The limited number of samples from a given stage, and the known TUEs of athletes make a mockery of this basic principle.

#### \*4P. Same Operator

**CAS Landaluce is Precedent**<sup>192, 193</sup>

**Possible ISL Violation**<sup>194</sup>

ISL 5.2.4.3.2.2:<sup>195</sup>

“A different analyst must perform the ‘B’ analytical procedure. The same individual(s) that performed the ‘A’ analysis may perform instrumental set up and performance checks and verify results.”

Arnie’s comment:

Presumably, this rule is in place to limit conflict of interest in analysis.

The orientation of the ‘B’ sample analysis should be to perform an independent test, free of bias.

However, at the LNDD laboratory, as you will read below, there is bias and conflict of interest.

The rule should be strengthened. Not only should the same operator not be involved in the analytic procedure, instrument set-up, performance check, or in verifying results, the analysis of the ‘B’ sample should be performed at a *different* lab.

How else is one to avoid systematic errors, such as the failure to remove the transport rings (Mickey Mouse Ears) of the IsoPrime2 machine? See also page 243.

#### Background: Landaluce

The December 12, 2006, the CAS decision on the Landaluce case confirms the annulment of his doping charge because the same analyst was involved in both the ‘A’ and ‘B’ samples.<sup>196</sup>

The CAS ruling observes the letter of the rule. The ruling states/implies that the degree (estimated at 10%) of involvement cannot be an issue. It implies that *any* involvement with handling the specimen is too much.

#### LNDD Admits Fault

LNDD admitted to the CAS arbitrators in Landaluce that it knew about the rule, but that it chose to ignore it because of work overload.

115. The Panel does emphasize the LNDD’s staff’s good faith, which is not in question. The arbitrators have no reason to doubt the explanation given by Prof. De Ceaurriz according to which the “overlap” of operations done by the analysts was due to work overload within the LNDD. Furthermore, he pointed out that ill-intentioned accomplices would have covered up their actions by writing reports on analyses in such a way that they couldn’t potentially be blamed for any failure. In this case, it is exactly the contrary; the athlete wins based on laboratory information that was communicated honestly.

**Figure 91. CAS ruling on Landaluce. The LNDD director knew that analyst overlap was against the rules—but allowed it because of work overload.**

Arnie’s comment:

In other words, the laboratory admits that it permitted a lapse in protocol due to workload—it cheated.

<sup>192</sup> TAS 2006/A/1119 Union Cycliste Internationale (UCI) c/ Iñigo Landaluce Intxaurreaga & Real Federación Española de Ciclismo (RFEC). <http://www.tas-cas.org/fr/pdf/Landaluce.PDF>. Accessed Mar 2, 2007.

<sup>193</sup> Also FINA vs. Oliva. <http://www.fina.org/antidoping/pdf/GuerraOliva2007-02-23.pdf>. Accessed Mar 2, 2007.

<sup>194</sup> For more on the significance of ISL and other violations, see page 16.

<sup>195</sup> WADA International Standard for Laboratories. 5.2.4.3.2.2. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>196</sup> TAS 2006/A/1119 Union Cycliste Internationale (UCI) c/ Iñigo Landaluce Intxaurreaga & Real Federación Española de Ciclismo (RFEC). In Landaluce, a 10% overlap in workload by the same analyst in the ‘A’ and the ‘B’ sample was noted as a violation of the ISL. For this violation, Landaluce was exonerated. 107. It was indeed for the UCI to demonstrate that the failure to meet point 5.2.4.3.2.2 of the ISL was not at the origin of the adverse finding. To the extent that the UCI did not succeed in doing so, the Panel’s only possible conclusion is to exonerate Mr. Landaluce. 109. The Panel must watch over the respect of fundamental rules, considering the implications that its decision could have on the reputation, and therefore, the career of the athlete, if a disciplinary sanction were to be pronounced against him. 111. It is virtually impossible to prove a negative fact, in this case that the involvement of the same analyst in both analyses did not affect the result.

## LNDD Tests With Bias/Conflict of Interest

### *'B' Confirming 'A' Biases Approach*

Again, the 'B' analysis should be independent of the 'A' analysis. Only after the analysis is complete, should the results be compared to the 'A' to determine whether both results are adverse.

Frelat testified that when she performs the 'B' analysis, her goal is to "confirm" the first analysis, which had given a positive result.<sup>197</sup>

CAS Hearing Transcript Page 913

1 CLAUDE FRELAT - REDIRECT  
MR. PAULSSON:  
11 As a matter of curiosity, in  
12 your witness statement you have a  
13 section which is entitled "Confirmation  
14 by the B sample." That's the title.  
15 So this might be a question about the  
16 words that you use. In working on the  
17 B sample you were confirming a  
18 positive, were you?  
19 THE WITNESS: Yes.  
20 MR. PAULSSON: And what was  
21 that positive?  
22 THE WITNESS: It was Mr.  
23 Landis' sample 995474.  
24 MR. PAULSSON: But you were  
25 working on B?

CAS Hearing Transcript Page 914

1 CLAUDE FRELAT - REDIRECT  
2 THE WITNESS: Yes.  
3 MR. PAULSSON: And it was  
4 confirming a positive?  
5 THE WITNESS: It was to  
6 confirm the first analysis which had  
7 given a positive result.  
8 MR. PAULSSON: So you were  
9 confirming A? The work on the B sample  
10 confirmed the results of the A sample?  
11 THE WITNESS: Yes.

The improper belief that the goal of the 'B' sample analysis is to confirm the 'A' sample analysis is made worse as LNDD engages in manual processing. In performing her analyses, Frelat has the ability to manipulate and alter the results so that the 'B' sample results match the 'A' sample.

While Frelat may or may not have the 'A' sample test results in front of her, she can see the isotopic values from her test sample on screen. She will know whether the result is adverse or not. If, for example, the 5-alpha minus the P-diol did not result in a delta-delta value larger than negative three, she can manually process the results to obtain a positive delta-delta value

### *LNDD Organization Structure Creates Conflict of Interest*

Four operators had major roles in the analysis of sample 995474. The major roles in analysis were by these operators:

- Esther Cerpolini (18), the 'A' sample GC/MS.
- Ruddy Barlagne (23), the 'B' GC/MS.
- Cynthia Mongongu (49), the 'A' sample IRMS.
- Claire Frelat (26), the 'B' sample IRMS.

In the IRMS test, the laboratory's organization structure creates conflicts of interest.

	IRMS Operator	IRMS Verifier	IRMS Supervisor
'A' Sample	Mongongu	Frelat	Buisson
'B' Sample	Frelat	Mongongu	Mongongu

**Table 15. IRMS Personnel. In the 'A' sample, Frelat verifies the work of Mongongu, her supervisor. In the 'B' sample, Frelat works to confirm the results of Mongongu from the 'A' sample, while Mongongu checks her results.**

<sup>197</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

LNDD's reporting structure does not support independent analysis. Frelat reports to Mongongu. When Frelat performs the 'B' sample analysis with the goal of confirming the 'A' sample analysis, she (1) confirms her supervisor's 'A' sample analysis and (2) her own previous verification of that 'A' sample analysis.

If the 'B' analysis does not match the 'A' analysis, Frelat would essentially be establishing that (1) her supervisor incorrectly performed the original analysis and (2) that she incorrectly verified that analysis.

To make matters worse, Mongongu also checks (verifies) the 'B' sample analysis.

Here is Frelat's testimony at the CAS hearing:<sup>198</sup>

CAS Hearing Transcript

Page 916

15 MR. PAULSSON: Structurally  
16 in the laboratory is it correct that  
17 you report to Ms. Mongongu?  
18 THE WITNESS: Yes. I also  
19 fill out reports to show that I have  
20 prepared the machines correctly. She  
21 verifies, she confirms the logs and she  
22 confirms that the records that I have  
23 filled out have been correctly filled  
24 out and that there are no problems.  
25 MR. PAULSSON: Maybe there's

CAS Hearing Transcript

Page 917

1 CLAIRE FRELAT - REDIRECT  
2 a problem with translation.  
3 MS. HATTON: The control is  
4 quality control chart.  
5 THE WITNESS: She checks  
6 that I have filled out the quality  
7 control charts correctly and that there  
8 are no problems.  
9 MR. PAULSSON: Does that  
10 mean that the confirmation of the  
11 positive does not end with you, it also  
12 has to be approved at her level?  
13 THE WITNESS: Yes.

## Operator 18 Has Involvement in 'A' and 'B'

### Chain of Custody Record is Unreliable

In order to determine where the same analyst was involved in the 'A' and the 'B' sample testing, we need an accurate chain of custody.

As reviewed beginning on page 93, there is no compliant chain of custody documentation for this analysis.

### USADA0253, USADA0255.

Operator 18 (Esther Cerpolini) clearly had a major role in the analysis of the 'A' sample.

Ms. Cerpolini also had a role in the 'B' sample. This operator is specifically noted to have been responsible for removing the sample from the freezer to thaw.

The image shows two chain of custody records side-by-side. The left record is for USADA0253 and the right is for USADA0255. Both records have a header section with 'LNDD', 'ENREGISTREMENT', and 'Certification : B-TE-05 A'. Below this is a section titled 'TRACABILITE DES FLACONS A ET B'. The main body of each record is a table with columns: 'Date', 'Cade (opérateur)', 'Localisation', and 'Raisons du transfert'. In both records, the name 'Esther Cerpolini' is circled in red in the 'Cade' column for multiple entries. The right record also has a section titled 'Chaine de possession' with a circled 'B' and 'A'.

Figure 92. Operator 18 appears as an analyst in the chain of custody records in both the 'A' and 'B' samples. Operator 18's role was clearly more than the only allowed roles of instrument set-up, performance checks, and verification of results.

<sup>198</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

The ISL divides the separation of duties requirement into two areas: (1) analytical procedure and (2) instrument set-up/performance set-up/results verification.

Is thawing the sample part of the analytical procedure?

I would argue that overseeing the thawing is part of the analytic process for the first three of five reasons discussed below:

#### **Reason 1**

The document M-TE-05 appears to be referenced concerning the analyst's/operator's role in thawing a specimen (USADA0028).

Since the process of thawing has an attached SOP, this argues that it is part of the analyst's role/analysis.

#### **Reason 2**

Thawing the specimen is clearly NOT part of (2) instrument set-up/performance set-up/results verification.

Since there are only two options contemplated in the ISL, the only possibility is to place the procedure in (1) analytical procedure.

#### **Reason 3**

##### **USADA0232.**

According to the Laboratory Director, the *analysis* of the 'B' sample was to begin at 9:00 AM August 3, 2006.

##### **USADA0254.**

Operator 18, Esther Cerpolini, began the analysis and her chain of custody at 9:12 AM. The sample was in the custody of this operator for almost two hours.

#### **Reason 4**

Cerpolini seems to have done more than just remove the sample for thawing.

##### **USADA0288.**

Cerpolini appears to have calculated, not verified the corrected-for-specific-gravity T/E concentrations on USADA0288. This is more than instrument set-up; it is more than verifying someone else's results: it is determining results.

Cerpolini appears to have some role to play in setting up the machine on USADA0289. I am not sure if her initial on this page signifies something more.

#### **Reason 5**

##### **USADA0251.**

Cerpolini signed her name (as did others) as having opened the 'B' sample. Note: According to Paul Scott, this is not the way things are done at the UCLA laboratory. At UCLA, only the individual physically opening the sample signs.

##### **USADA0251. USADA0288.**

(Caveat: I am not a handwriting expert.) Cerpolini recorded the volume of urine present in the container at its opening. She is therefore the one who most likely measured the volume. This handwriting appears to match the handwriting, specifically the '5,' at the bottom of USADA0288.

##### **Arnie's comment:**

We do not really know what the true story is here. We asked to depose the operator ahead of arbitration to avoid wasting arbitration time if the Operator 18 issue turned out *not* to be a problem. This was not permitted.

If Landis were to be exonerated solely on the basis of Operator 18's involvement in both the 'A' and the 'B' samples, frankly, I'd think he was "getting off on a technicality."

On the other hand, considering the bias and conflict of interest of the lab, as discussed above, if the laboratory is not found guilty of violating ISL 5.2.4.3.2.2, it will be the laboratory that is "getting off on a technicality."

#### **\*4Q. Inadequate Lab Security**

##### **ISL Violation<sup>199</sup>**

##### ***Software***

ISL 5.4.4.4.1.3.<sup>200</sup>

“The software shall prevent the changing of results unless there is a system to document the person doing the editing and that editing can be limited to users with proper level of access.”

ISL 5.4.4.4.1.4:

“All data entry, recording of reporting processes and all changes to reported data shall be recorded with an audit trail. This shall include the date and time, the information that was changed, and the individual performing the task.”

For more about software issues, see *Obsolete Software* on page 118.

Simon Davis's comment:

There is some password protection on the OS2 system, but you can change the peak integration without any record of what you have done, or that a change has taken place. You can essentially make the system give you any number you want, and no one would be any the wiser.

##### ***Whistleblower Documents***

The laboratory alleges hacking of its computer system. This may have been in August or September of 2006.

ISO and WADA standards clearly require laboratories to be secure.

After the alleged hacking, reports are that more money was requested and allocated for laboratory security.

For more about the “whistleblower” documents, see page 299.

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<sup>199</sup> For more on the significance of ISL and other violations, see page 16.

<sup>200</sup> WADA International Standard for Laboratories. 5.4.4.4.1.3 and 5.4.4.4.1.4. (2004).  
[http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

## 5. GC/MS: Testosterone/Epitestosterone Ratio

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*Tests must be reliable (repeatable) and valid (accurate).*

*The T/E ratio test as performed by LNDD was neither.*

*The lack of validity according to standard laboratory practices, as well as minimum WADA requirements, is case dispositive.*

This test measures the ratio between two hormones, testosterone and epitestosterone, in urine.

In basic theory, the body produces equal amounts, or at least excretes equal amounts, of these two hormones in urine.

In theory, doping with testosterone will raise the ratio—by increasing the amount of testosterone and by suppressing the body's natural production of epitestosterone.

For more information about T/E testing theory, see page 287.

For more information on chromatography, see *Appendix G: Test Procedures and Problems* on page 313.

### T/E Introduction

- An abnormal T/E test is not necessary to confirm doping.
- An abnormal T/E test is not sufficient to confirm doping.
- An abnormal T/E longitudinal profile is sufficient to confirm doping, although in practice this method is error-prone.
- A positive IRMS alone is sufficient to prove doping. Although the usual process is (1) a screening T/E ratio, (2) three confirmation T/E ratios, and then (3) IRMS, IRMS can be performed without any T/E analysis.

Although some presume that an abnormal T/E test demonstrates doping unless shown otherwise, WADA data show that more often than not, doping is *not* shown to have occurred following an abnormal T/E test.

- For screening values between 4 and 6 (Landis's values were 4.9 and 5.1), doping was reported confirmed only 2 or 3 times in 955 samples within this range in 2005.
- For screening values between 10 and 15, doping was reported confirmed only 11 times in 25 samples within this range in 2005.<sup>201</sup>

LNDD is inaccurate in its T/E test analyses.

- An accurate test requires proper substance (peak) identification. Substances were *not* properly identified.<sup>202</sup>
- Many of the procedural arguments, starting on page 93, apply to the T/E test.
- There are so many obvious *procedural* laboratory errors in the T/E analysis, especially in the 'A' sample, that the general proficiency of the laboratory to conduct *any* testing can be challenged.
- There are basic questions about the integrity of the processed urine. Some of these questions are discussed starting on page 134. Some of these questions are discussed later in this section.
- An accurate test requires proper processing of the sample, including *extraction efficiency* and *derivatization*, problematic in these analyses, discussed later in this section.

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<sup>201</sup> Delbeke, F. Report at the Anti-Doping Convention meeting of the Advisory Group on Science, Strasbourg. July 11, 2006. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>202</sup> Accurate peak identification is always important. Peak identification might be expected to be especially critical in Landis, due to his TUE use of corticosteroids for his osteoarthritic hip. Pujos (2004) has shown that corticosteroid intake reduces the excretion of some androgen steroids and leads to the appearance of other compounds. Pujos, E., et al. Optimizing the extraction and analysis of DHEA sulfate, corticosteroids and androgens in urine: application to a study of the influence of corticosteroid intake on urinary steroid profiles. *Anal Bioanal Chem.* 380, 524-536. (2004).



**T/E Testing Summary Results**  
**Landis's Stage 17, Sample 995474**

Sample	Procedure	Calibration Date	Calibration Time	T/E Measured	T	EpiT	Bates Page
A	"1 <sup>st</sup> Screen"	July 21	13:26	<b>4.9</b>	60.6	13.7	USADA0054
A	"2 <sup>nd</sup> Screen"	July 25	15:15	<b>5.1</b>	49.7	11.1	USADA0057
A	"1 <sup>st</sup> Confirmation"	July 24	12:54	<b>10.7</b>	172.23	17.59	USADA0212
A	"2 <sup>nd</sup> Confirmation"	July 24	17:15	<b>11.4</b>	61.37	5.2	USADA0092
A	Free (Unhydrolyzed)	July 24	12:54	<b>11.2</b>	1.06	0.10	USADA0214
B	"1 <sup>st</sup> Confirmation"	August 4	7:32	<b>10.9</b>	63.2	5.9	USADA0278
B	"2 <sup>nd</sup> Confirmation"	August 4	7:32	<b>11.0</b>	61.6	5.8	USADA0279
B	"3 <sup>rd</sup> Confirmation"	August 4	7:32	<b>11.1</b>	60.2	5.6	USADA0281
B	Free (Unhydrolyzed)	August 4	7:32	<b>3.6</b>	1.22	0.44	USADA0283

**Table 16. Landis's Stage 17 sample was analyzed a total of nine times for testosterone (T) and epitestosterone (E). Absolute testosterone and epitestosterone values are raw values; they are *not* corrected for specific gravity. The lab failed to identify both testosterone and epitestosterone according to minimum WADA requirements. Even if the values had been measured accurately, by WADA's own statistics, Floyd's sample was, more likely than not, an analytic negative.**

**\*\*\*5A. Bad Identification: Single Ion  
Failure to Properly Identify T and E is Case Dispositive**

**ISL Violation<sup>203</sup>**

ISL 5.4.4.3.1:<sup>204</sup>

“The Laboratory must establish criteria for identification of a compound *at least as strict* as those stated in any relevant Technical Document.”

TD2004EAAS:<sup>205</sup>

“The confirmation of the identity of any steroid reported with abnormal properties must be made (refer to technical document TDE2003IDCR).”

TD2003IDCR:<sup>206</sup>

“The laboratory must establish criteria for the identification of a compound.”

The document describes typical acceptable criteria:

Full scans or single ion monitoring (SIM) is acceptable.

With SIM, the identity and quantification of the T and E peaks must be confirmed by at least two, preferably three diagnostic ions in the mass spectrum. Identification based on retention times alone is inadequate.<sup>207</sup>

<sup>203</sup> For more on the significance of ISL and other violations, see page 16.

<sup>204</sup> WADA International Standard for Laboratories. 5.4.4.3.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>205</sup> WADA TD2004EAAS. 2. (2004). Reporting and evaluation guidance for testosterone, epitestosterone, T/E ratio and other endogenous steroids. [http://www.wada-ama.org/rtecontent/document/end\\_steroids\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/end_steroids_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.

<sup>206</sup> WADA TD2003IDCR. 1. (2003). Identification criteria for qualitative assays incorporating chromatography and mass spectrometry. [http://www.wada-ama.org/rtecontent/document/criteria\\_1\\_2.pdf](http://www.wada-ama.org/rtecontent/document/criteria_1_2.pdf). Accessed Dec 28, 2006.

<sup>207</sup> WADA TD2003IDCR. 1-2. (2003). Identification criteria for qualitative assays incorporating chromatography and mass spectrometry. [http://www.wada-ama.org/rtecontent/document/criteria\\_1\\_2.pdf](http://www.wada-ama.org/rtecontent/document/criteria_1_2.pdf). Accessed Dec 28, 2006.

*The LNDD has failed to meet the minimum criteria for steroid identification.*

*This failure should end the case in so far as GC/MS for T/E ratio and longitudinal evaluation.*

For more information as to why identification based on ion mass and retention time alone is inadequate, see *Appendix G: Test Procedures and Problems* on page 313.

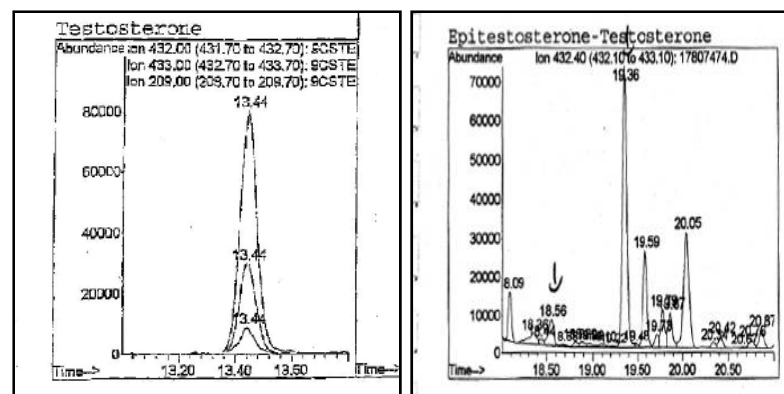


Figure 93. Identifying ions: good and bad.

Left, good: UCLA laboratory<sup>208</sup>: Three overlapping testosterone ions are identified with a retention time of 13.44 minutes. The curves overlap and are of the same shape.

Right, bad: LNDD (USADA0213): The (single ion) peak at 19.36 is called testosterone based on retention time alone.

In a further example of dubious chromatography, the LNDD peak at 18.56 was identified through the mired baseline and called epitestosterone.

LNDD *does* measure more than one ion in its confirmation work:

LNDD measures a total of nine ions (‘A’ sample, first confirmation, USADA0203; ‘A’ sample, second confirmation, USADA0082, ‘B’ sample: USADA0267).

<sup>208</sup> Chromatograms for a recent UCLA case courtesy of Howard Jacobs.

***However, the laboratory does not provide target response or chromatographs for more than one testosterone or epitestosterone ion.***

***There is no indication that the laboratory looked at these ions.***

Paul Scott's comment:

TD2004EAAS is the controlling document. It requires that ion 432 (LNDD uses 432.4, The UCLA laboratory uses 432.3) be used to establish the T/E ratio (using peak area or peak height). This is true of both the screen and the confirmation. TD2004EAAS also requires, for the confirmations, that "the identity of any steroid reported with abnormal properties must be made..." It then references TD2003IDRC as the document controlling such identification.

TD2003IDRC provides, in short, four options for such identification:

1. Full scan with at least three diagnostic ions available at a relative abundance greater than 5%.
2. Full scan on a second "run" of the sample with such second "run" using a different derivative (or ionization technique) producing different diagnostic ions.
3. SIM with at least three diagnostic ions.
4. SIM with at least two diagnostic ions per "run." Each such "run" using a different derivative (or ionization technique) producing different diagnostic ions.

All evidence we have indicates that LNDD did none of these. It appears to "identify" T and E exclusively using retention time and a single ion (432.4).

The UCLA laboratory uses full scan when it can and falls back on SIM with three diagnostic ions if full scan does not produce usable results (at least three measurable ions with a relative abundance greater than 5%). To my knowledge, UCLA would not use options 2 or 4, choosing instead in such cases (if any have ever happened), to report the sample as negative.

Arnie's comment:

This section of TD2003IDCR that at least three diagnostic ions are required, and then allowing for a minimum of two, appears poorly crafted to me. If the minimum is three, it is three. If it is two, do not say three.

Regardless, the ISL indicates a standard at least as strict as stated in any TD.

Therefore, at a minimum, three diagnostic ions are required.

Another possibility, which some labs use, is MS/MS identification. This was not performed in the T/E confirmation. (MS/MS was performed for a process in the screening, USADA0036, perhaps for underivatized steroid screening.)

Arnie's comment:

We also show in *Matrix Interference* on page 155 that the laboratory has failed to eliminate or account for obvious sources of interference in its analysis of blank urine and in Landis's sample.

Please keep in mind that had these unknown substances, by chance, have been even closer in retention times to the putative substances being measured, these errors might not have been uncovered.

The principle here is that the method of the LNDD is flawed.

The LNDD has *not* established that the peaks it has identified as testosterone and epitestosterone are, in fact, these substances, nor has it established that the height or area of these peaks is solely the result of these compounds.

## Ion Mass

As previously noted, LNDD uses only one ion in testosterone and epitestosterone identification.

Note again, that the UCLA laboratory captures three testosterone ions. One of these ions, with a minimal molecular weight of 432.00, has its capture set between 431.70 and 432.70. A second ion has a nominal molecular weight of 433.00 with a capture set between 432.70 and 433.70.

In the LNDD work, the molecular weight is set at 432.4 with capture between 432.10 and 433.10.

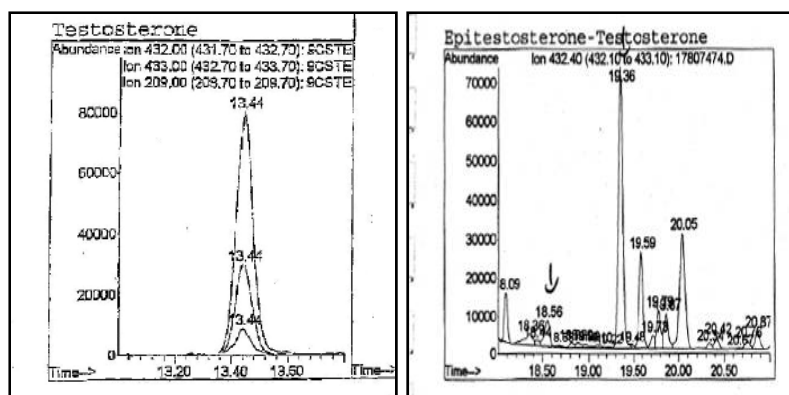


Figure 94. Left, good: UCLA laboratory. Right, bad: LNDD. At LNDD, the single ion monitoring parameters may be bracketing two testosterone ions.

Bruce Goldberger's comment:

It is possible that the LNDD work is capturing two ions in one peak.

## Full Scans Not Performed

Standard laboratory practice, and the standard at UCLA, is to show full scans. However, three-ion SIM is acceptable. LNDD did not perform a full scan.

## LNDD: Not Good Enough

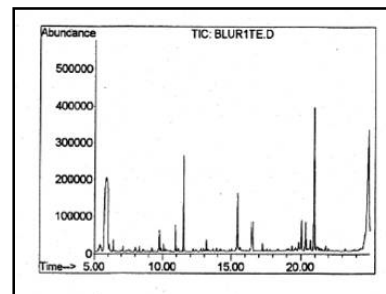
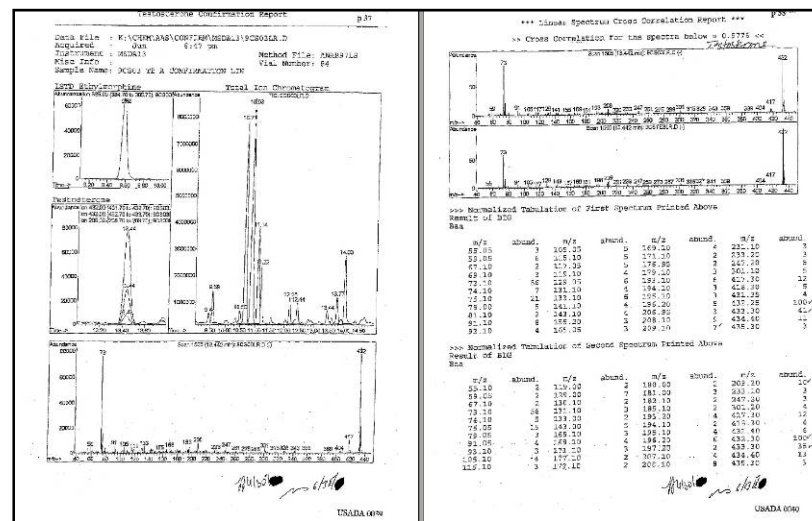


Figure 95. USADA0091. The LNDD report contains only the overall chromatogram. A full scan has not been performed. Ions and their relative proportions are not identified.

## UCLA: Gets it Right



### \*\*\*5B. Bad Identification: Matrix Interference 'A' and 'B' Samples

#### Problem with Overlapping Substances

#### ISL Violation<sup>209</sup>

ISL 5.4.4.2.1:<sup>210</sup>

“Matrix interferences. The method must avoid interference in the detection of *Prohibited Substances* or their *Metabolites or Markers* by components of the sample matrix.”

***Matrix interference—poor quality chromatography—is found throughout the document package.***

Matrix interference refers to sample characteristics that interfere with the test method execution such that reliable data cannot be generated.

Common matrix interference is the presence of a non-target compound in high concentrations.

Other causes of matrix interference include samples with extreme pH and chemical constituents that react with target analytes.

Urine is complex: it is made up of many substances (thousands?). Some of them will look like the substances being tested for and therefore make analysis difficult, if not impossible.

For example, consider that you are sorting coins by weight, and come across a coin that weighs about 5.5 grams, you might guess that you have found a quarter—because in your experience a 50-cent piece weighs 10 grams, a quarter 5.6 grams, a nickel 4.4 grams, and a dime 2.2 grams.

However, if you are examining a complex pile of coins from around the world, suddenly there are many candidates for about 5.5 grams, and you can no longer be sure that you have yourself an American quarter.

#### ***Background: Retention Time***

“The amount of time that a compound is retained in the GC column is known as the retention time.

The retention time can aid in differentiating between some compounds. However, retention time is not a reliable factor to determine the identity of a compound.

If two samples do not have equal retention times, those samples are not the same substance. However, identical retention times for two samples only indicate a possibility that the samples are the same substance.

Potentially thousands of chemicals may have the same retention time, peak shape, and detector response. For example, under certain conditions, DDT (dichloro-diphenyl-trichloroethane) has the same retention time as PCBs (polychlorinated biphenyls).

Some believe that environmental testing showed erroneously high amounts of DDT. GC instruments (incorrectly) showed only one peak for what is believed to be a mixture of DDT and PCBs.

This experimental data led to the banning of DDT in the U.S.

Bluntly, GC is “one of the quickest ways of getting the wrong answer in qualitative analysis.”<sup>211</sup>

For more background information about GC/MS and GC/C-IRMS testing, see *Appendix G: Test Procedures and Problems* on page 313.

<sup>209</sup> For more on the significance of ISL and other violations, see page 16.

<sup>210</sup> WADA International Standard for Laboratories. 5.4.4.2.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>211</sup> Douglas, F. GC/MS Analysis. Scientific Testimony. <http://www.scientific.org/tutorials/articles/gcms.html>. Accessed Oct 14, 2006.

## USADA0100. USADA0292.

### *Quantifying spiked urines*

Figure 97 and Figure 98 are screen shots, in single ion mode, of the blanks from the 'A' and 'B' samples spiked with 2 ng/mL of testosterone and epitestosterone.

These analyses are meant to demonstrate the laboratory's ability to quantify testosterone and epitestosterone with known amounts of these hormones.

The peak heights or areas should be the same (areas are a better measure).

The right shoulder<sup>212</sup> in USADA0100 as opposed to USADA0292 suggests interference/coelutance of the 19.33 retention time peak in USADA0100—which the laboratory labeled as testosterone.

In the 'A' sample, I read the peak at 19.33 minutes at 40 millimeters and the peak at 18.53 minutes at 32 millimeters. Relatively speaking, the testosterone peak is 25% too high. Just eyeballing, the areas are even more divergent.

In the 'B' sample, I read the peak at 19.31 minutes at 46 millimeters and the peak at 18.51 minutes at 39 millimeters. Relatively speaking, the testosterone peak is 18% too high.

#### Arnie's comment:

If the laboratory cannot accurately analyze and measure what it knows is in the urine, because it has put it there, how can it analyze and measure unknown amounts?

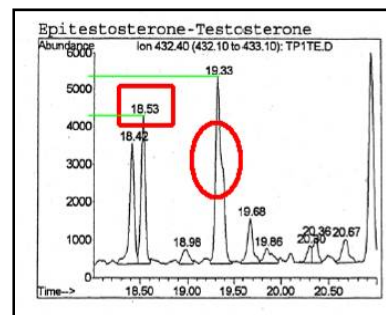


Figure 97. USADA0100. 'A' analysis blank spiked urine. The peaks or areas of the substances at 18.53 and 19.33 minutes should be about the same. The right shoulder (circled) on the peak at 19.33 minutes provides a clue that two substances are contributing to the peak.

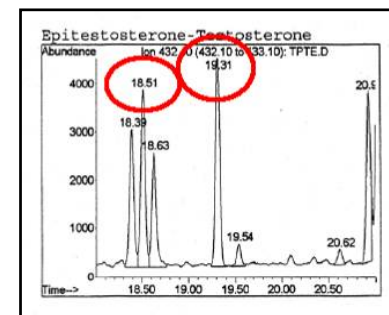


Figure 98. USADA0292. 'B' analysis blank spiked urine. The peaks or areas of the substance at 18.51 and 19.31 minutes should be about the same. Here they are closer than in Figure 97.

<sup>212</sup> For the significant of shoulders on chromatogram peaks, see *Test Procedures and Problems*, beginning on page 313.

USADA0091.

***Matrix interference of blank urine***

I believe that the matrix peak in the blank urine at 19.38 minutes, seen in single ion mode, Figure 99, may be responsible for the right shoulder<sup>213</sup> present in the putatively identified testosterone peak at 19.33 minutes in USADA 0100, Figure 100.

This unknown substance combines with the known (spiked) testosterone that peaks slightly earlier at 19.33 minutes. This artificially inflates any estimate of the level of testosterone in this sample.

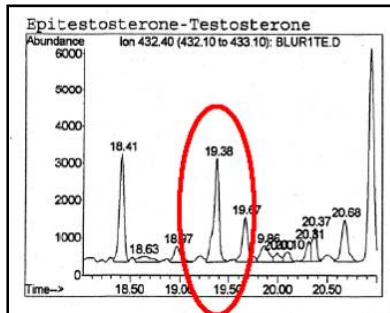


Figure 99. USADA0091. 'A' analysis, blank, unspiked urine. There is a peak at 19.38 minutes, with a left shoulder. I believe this substance may be contributing to a falsely high peak in the spiked urine of USADA0100, reproduced on the right.

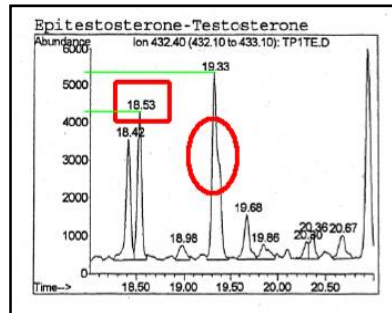


Figure 100. USADA0100. 'A' analysis, blank, spiked urine. The right shoulder (circled) on the peak at 19.33 minutes provides a clue that two substances are contributing to the peak that the laboratory identified as testosterone.

Arnie's comment:

This calls into question the laboratory's identification of testosterone; the presence of an additional substance in the blank urine matrix and spiked blank urine, or in the machine; the laboratory's general departure from protocol in technique; and the laboratory's inability to accurately perform analyses.

<sup>213</sup> For the significant of shoulders on chromatogram peaks, see *Test Procedures and Problems*, beginning on page 313.



## USADA0215. USADA0284.

### *Matrix interference of Landis's urine*

The putatively labeled testosterone peak at 19.37 in Landis's unhydrolyzed 'A' sample, USADA0215, Figure 101, has a left shoulder.<sup>214</sup> This suggests coelution and an overestimation of the amount of testosterone.

A more gently sloping leading edge than trailing edge on the putatively labeled testosterone peak at 19.38 in Landis's 'B' sample, USADA0284, Figure 102, suggests the same—although this is more subtle.

Bottom line; The lack of three-ion identification, as described in more detail on page 152, makes the T/E ratio, as determined by LNDD, suspect at best.

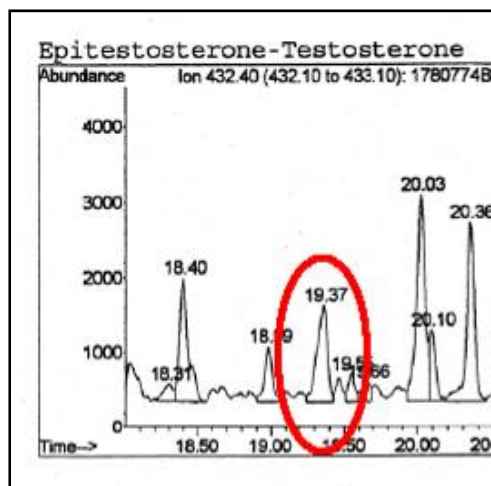


Figure 101. USADA0215. A left shoulder on the peak at 19.37 minutes suggests matrix interference/coelution on the putatively labeled testosterone peak in Landis's 'A' sample urine.

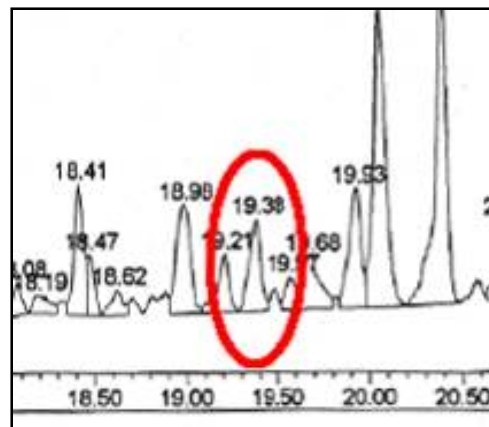


Figure 102. USADA0284. A more gently sloping leading edge than trailing edge of the peak at 19.38 minutes in Landis's 'B' sample suggests that matrix interference/coelution may be a problem. Without ion identification, the identification of testosterone is suspect.

<sup>214</sup> For the significant of shoulders on chromatogram peaks, see *Test Procedures and Problems*, beginning on page 313.

**\*\*\*5C. Bad Identification: T/E Peaks Misidentified  
Clear Misidentification**

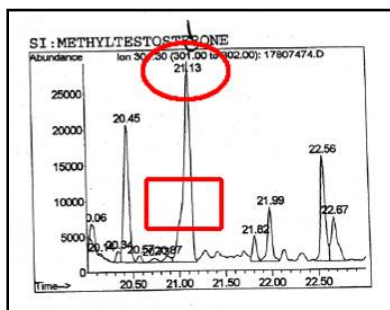
**TD2003IDCR Violation<sup>215</sup>**

TD2003IDCR:<sup>216</sup>

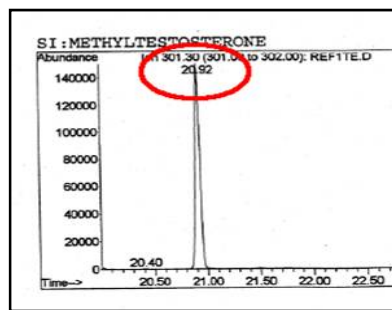
“[T]he retention time of the analyte shall not differ by more than one percent or  $\pm 0.2$  minutes (which ever is smaller) from that of the same substance in a spiked urine sample.”

**USADA0213. USADA0216.**

- In USADA0213, Figure 103, methyltestosterone is added to Landis’s ‘A’ sample as a quantitative reference. Its peak is identified at 21.13.
- In USADA0216, Figure 104, methyltestosterone is added to blank urine as a quantitative reference. Its peak is identified at 20.92.



**Figure 103. USADA0213.** In the ‘A’ sample, the LNDD identifies its internal standard, methyltestosterone (red circle), at a retention time of 21.13 minutes.



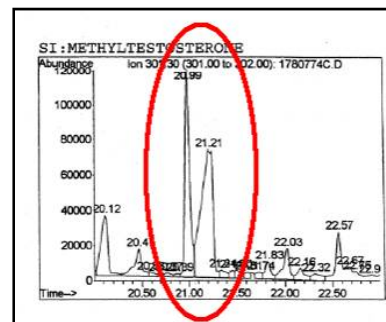
**Figure 104. USADA0216.** In the ‘A’ analysis of blank urine, the LNDD identifies methyltestosterone (red circle) at a retention time of 20.92 minutes.

In the ‘A’ sample, the retention times of methyltestosterone differ by 0.21 minutes, or more than 12 seconds.

Therefore, the process and conclusions are flawed.

The laboratory has failed to accurately perform the analysis and identify the peaks within WADA’s own standards.

**USADA0282.**



**Figure 105. USADA0282.** In the ‘B’ sample, the LNDD identifies methyltestosterone (red circle) at a retention time of 20.99 minutes. There is an unidentified substance eluting with a retention time of 21.21 minutes.

Wolfram Meier-Augenstein’s comment:

The pronounced fronting of the “peak” at 21.21 suggests either GC column overload or a mismatch between compound polarity and the GC column (e.g. a compound that ought not to be present if sample preparation was carried out according to protocol).

By requesting the GC/MS data and looking at a sequence of mass spectra along this “peak,” one should be able to identify the nature of this ‘peak’.

**Bottom line: The laboratory got it wrong.**

<sup>215</sup> For more on the significance of ISL and other violations, see page 16.

<sup>216</sup> WADA TD2003IDCR. 1. (2003). Identification criteria for qualitative assays incorporating chromatography and mass spectrometry. [http://www.wada-ama.org/rtecontent/document/criteria\\_1\\_2.pdf](http://www.wada-ama.org/rtecontent/document/criteria_1_2.pdf). Accessed Dec 28, 2006.

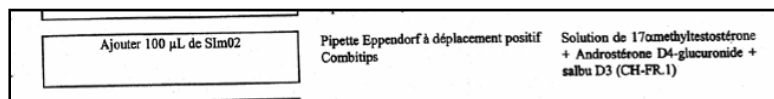
**\*\*\*5D. Bad Identification: Deuterated Androsterone Impossible, Absurd Identification in Confirmation T/E**

*LNDD detects and quantifies a substance in a aliquot of Landis's urine that cannot, or should not, be present.*

USADA0037. USADA0060. USADA0195.  
USADA0051. USADA0057.

1. USADA0037. There are 23 steps listed in the operation method for the preparation of an aliquot for anabolic screening via GC/MS.

In step 2, Figure 106, three internal reference substances are added during the screening procedure: 17 $\alpha$ -methyltestosterone, androsterone D4-glucuronide, and sabutamol D3.



**Figure 106. USADA0037. In the screening procedure, three reference substances are added: 17 $\alpha$ -methyltestosterone, androsterone D4-glucuronide, and sabutamol D3.**

2. USADA0060. Here the calibrated added amounts of these three internal reference substances (17 $\alpha$ -methyltestosterone, androsterone D4-glucuronide, and sabutamol D3) appear to be 200 ng/mL, 125 ng/mL, and 100 ng/mL respectively.

Note that D4 and D3 designate how many hydrogens in a compound have been substituted with deuterium. Deuterium has a molecular weight of 2. It is an isotope of hydrogen, which has a molecular weight of 1.

Deuterated molecules are often used in GC/MS because the extra neutron in the nucleus creates identifiable peaks that are not found naturally in urine.<sup>217</sup>

Adding a known quantity of a deuterated molecule helps quantify the amount of other substances.

Ret Time	Signal	Name	Target Response	Amount	Units
16.99	301.3	Methyltestosterone	1,587,292	200	ng/ml
12.21	438.4	Andro -D4 gluc	62,992	125	ng/ml
4.08	372.3	Salbutamol -D3	472,321	100	ng/ml

**Figure 107. USADA0060. The three reference substances are added in calibrated amounts: 17 $\alpha$ -methyltestosterone, 200 ng/mL; androsterone D4-glucuronide, 125 ng/mL; and sabutamol D3, 100 ng/mL.**

3. USADA0051. Methyltestosterone is detected and used as an internal reference standard to calibrate the target response. The amount of methyltestosterone is set at 200 ng/mL.

Androsterone D4-glucuronide and sabutamol D3 are also detected in amounts of 798 ng/mL and 194 ng/mL, rather than the expected 125 ng/mL and 100 ng/mL respectively.

These amounts are greater than expected, as outlined in point 2, above. If the laboratory cannot accurately detect what is known to be present in the urine, how can it detect unknown?

#	Peak Type	Ret Time	Signal	Name	Target Response	Amount	Units
1)	*ISTD	17.00	301.3	Methyltestosterone	1,788,970	200	ng/ml
2)		12.14	438.4	Andro -D4 gluc	453,080	798	ng/ml
3)		4.13	372.3	Salbutamol -D3	1,030,764	194	ng/ml
4)		12.20	434.4	Androsterone	3,875,172	710	ng/ml

**Figure 108. USADA0051. The three reference substances are detected in Landis's first screening analysis: 17 $\alpha$ -methyltestosterone, 200 ng/mL; androsterone D4-glucuronide, 798 ng/mL; and sabutamol D3, 194 ng/mL.**

<sup>217</sup> Deuterium. From Wikipedia, the free encyclopedia. <http://en.wikipedia.org/wiki/Deuterium>. Accessed Jan 8, 2006.

4. USADA0195. There are 21 steps listed in the operation method for the preparation of an aliquot for anabolic confirmation via GC/MS.

In step 8, Figure 109, the reference standard 17 $\alpha$ -methyltestosterone is added. Note that neither androsterone D4-glucuronide nor salbutamol D3 is added.

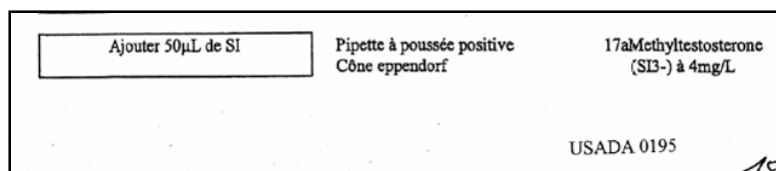


Figure 109. USADA0195. In the confirmation procedure, one reference substance is added: 17 $\alpha$ -methyltestosterone. Note that neither androsterone D4-glucuronide nor salbutamol D3 is added.

5. USADA0057. Figure 110. Methyltestosterone is detected and used as an internal reference standard to calibrate the target response. (See the note on the top right quadrant of the page.)

The amount of methyltestosterone is set at 100 ng/mL. This is a different amount than in a standard screening because the urine used was from an aliquot that was prepared by the confirmation method.

*Androsterone D4-glucoronide is detected at the level of 170 ng/mL. This is more than three times the level of testosterone detected.*

*Androsterone D4-glucoronide is not a component of human urine. Androsterone D4-glucoronide is not added in the confirmation operation method.*

Résultats :		Négatif	[ ]
		A vérifier	[ ]
Remarques :			
Vial de conf. reinjecté			
en screening			
Name	Target Response	Amount	Units
Methyltestosterone	1,731,969	100	ng/ml
Andro -D4 gluc	104,768	170	ng/ml
Salbutamol D3	0	0	ng/ml
Androsterone	9,973,015	1658	ng/ml
Etiocannabinolone	11,119,071	1620	ng/ml

Figure 110. USADA0057. Processed urine from the confirmation procedure, which does not contain deuterated androsterone, was reinjected in a second screening procedure. Deuterated androsterone was then found and measured—an impossible and absurd situation.

Arnie's comment:

The LNDD has detected a substance that cannot or should not be present.

Possibilities include (1) sample mix-up, (2) cross-contamination, and (3) peak misidentification.

If the method used was misreported, and was, in fact, the screening method, then the methyltestosterone should have been reported as 200 ng/mL and salbutamol should have been detected.

*I can think of no explanation that does not imply a fatally flawed analysis.*

**\*\*5E. No Controls in Run  
Procedure in Most Quality Labs**

**ISL Violation<sup>218</sup>  
TD2003LDOC Violation  
TD2004EAAS Violation**

ISL 5.4.7.3:

Analytical performance should be monitored by operating quality control schemes appropriate to the type and frequency of testing performed by the Laboratory. The range of quality control activities includes:

- *Positive* and *negative controls* analyzed in the same analytical run as the Presumptive Adverse Analytical Finding Sample.
- The use of deuterated or other internal standards or standard addition.
- Comparison of mass spectra or ion ratios from selected ion monitoring (SIM) to a Reference Material or Reference Collection sample analyzed in the same analytical run.
- Confirmation of the ‘A’ and ‘B’ Split Samples.”

TD2003LDOC:<sup>219</sup>

The laboratory document package should contain:

“Confirmation procedure data on *negative, positive*, and all Athlete aliquots.” [Emphasis added.]

That is to say, control data must be included.

TD2004EAAS:<sup>220</sup>

“Appropriate calibration (e.g. calibration curve, deuterated standards, *quality control* samples) is to be included in the protocol of the confirmation Procedure.” [Emphasis added.]

Arnie’s comment:

Laboratories should run random controls (samples of known value) in their runs as part of quality control.

Discussed in the context of IRMS on page 222.

<sup>218</sup> For more on the significance of ISL and other violations, see page 16.

<sup>219</sup> WADA TD2003LDOC. Laboratory Documentation Packages. 2, 3 (2003).  
[http://www.wada-ama.org/rtecontent/document/lab\\_docs\\_1\\_3.pdf](http://www.wada-ama.org/rtecontent/document/lab_docs_1_3.pdf).  
Accessed Dec 28, 2006.

<sup>220</sup> WADA TD2004EAAS. 2. (2004). Reporting and evaluation guidance for testosterone, epitestosterone, T/E ratio and other endogenous steroids. [http://www.wada-ama.org/rtecontent/document/end\\_steroids\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/end_steroids_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.

**\*\*5F. T and E Values Vary ('A' Sample)  
Radically Different Results**

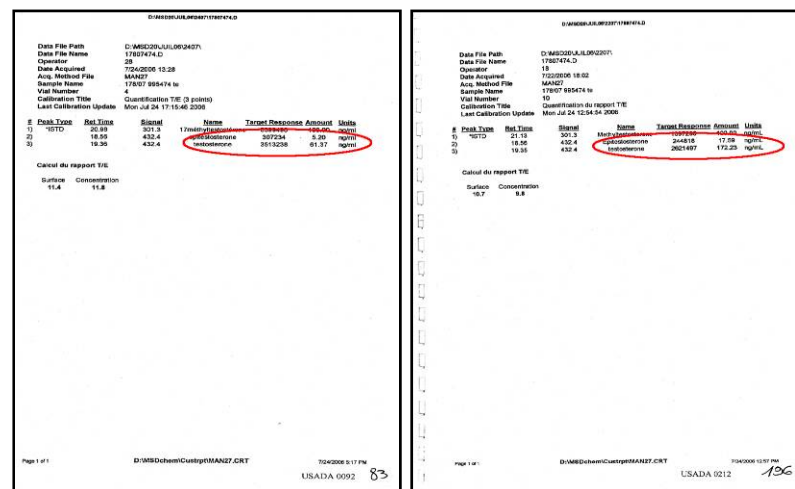
**USADA0092 and USADA0212.**

The laboratory performed two confirmation analyses of Landis's 'A' sample: Both of these are hydrolyzed aliquots.

Reference	T	E	T/E Calculated	Calibration Update
USADA0092	61.37	5.2	11.8	July 24, 2006. 17:15:46
USADA0212	172.23	17.59	9.8	July 24, 2006. 12:54:54

**Table 17. Radically different results in absolute testosterone and epitestosterone values cast doubt on the LNDD's ability to accurately perform analysis.**

If the formally reported value in USADA0092 is taken as correct, then USADA0212 represents a 181% error



**Figure 111. USADA0092. USADA0212. Unacceptable error in T and E absolute values in confirmation aliquots of 'A' sample.**

Arnie's comment:

This is an unacceptable variance by the lab's and WADA's own standards.

Absolute values, not just T/E ratios, must count because: (a) an absolute value greater than 200 ng/mL of T or E is a trigger for IRMS testing and (b) absolute hydrolyzed values are used, together with free T and E, to calculate ratios that are markers for degradation/contamination.

These sample discrepancies seriously undermine the lab's ability to conduct valid tests.

**What really happened?**

We do not need to, and should not explain why the laboratory erred. That is up to them. That said, here is one possible scenario:

Perhaps the laboratory operator used 5 µL instead of 50 µL of methyltestosterone as the internal standard.

In most other tests in the document package, methyltestosterone elutes at about 20.92 minutes. Here it coelutes with a substance present in Landis's urine that otherwise elutes at 21.13, giving a peak about one-third of what 10 times the amount of methyltestosterone alone would give. The relative abundances and left shoulder<sup>221</sup> on the putative methyltestosterone peak on USADA0213 substantiate this theory.

Therefore, a lab error in titration and the presence of coeluting substance(s) in Landis's urine combined to give a radically different result.

Note: Neither result may be accurate. Even if correction of the above two problems took place, and we had consistent results, those results may both be wrong—to name just one reason: due to non-derivatization.

Bottom line: The laboratory got it wrong.

<sup>221</sup> For the significant of shoulders on chromatogram peaks, see *Test Procedures and Problems*, beginning on page 313.



## **\*\*5G. T/E Ratios Not Accurate ('A' Sample) Logic of WADA Rules Say They Must Be Closer**

“Evaluation of longitudinal studies: In males, the individual T/E values have been shown to vary from their mean value by less than 30% (screening values). The individual basal T/E value should be determined from at least three test results, excluding the suspicious result under consideration. If the suspicious test result, when compared to the basal value using appropriate statistical evaluation is found to be significantly different, that will constitute a proof of the administration of a source of testosterone. The comparison of screening results and confirmed results is acceptable.”<sup>222</sup>

Although the standards for screening, including calibration curves, may be less rigorous than in confirmation samples, the screening values must be *reasonably* accurate.

How reasonably accurate must they be?

Since the screening and confirmation values can be used interchangeably to determine a positive in longitudinal testing, it is clear that the standard error in any direction must be less than 30%—or a positive test can be determined from the “longitudinal” serial examinations of identical urine—an intolerable situation.

In Landis’s ‘A’ sample, if USADA0092 would be the suspicious result, and USADA0057 the basal value, the standard error is 124%. This discrepancy is intolerable.

Reference	T/E (Surface)	Machine
USADA0057	5.1	MSD 19
USADA0092	11.4	MSD 20
Percent error	124%	

**Table 18. T/E values are not consistent nor are they reasonably accurate. An important error has occurred.**

### ***Faulty Analysis/Machine(s)***

In USADA0057 vs. USADA0092, there are no differences in sample preparation. The same prepared sample is run on two different machines (MSD 19 and MSD 20) and two different sets of results are found.

This points an even brighter light on the need to definitively identify the peaks that are being quantified (yet again, as required by the WADA rules).

A sample prepared on the same urine aliquot (it is the exact same sample, extraction, derivatization—all chemistry steps the same) and run through the two different machines purporting to measure the same thing, resulted in two different findings. The only difference between them is that the laboratory labeled one a confirmation test and the other a screening test.

At least one of the analyses must be wrong.

**Arnie’s comment:**

**This is an insupportable difference.**

**Possible conclusions from the lab’s different T/E values:**

- 1. The aliquots are from different samples.**
- 2. The lab, its methods, or its machines are defective.**
- 3. The WADA rules have no basis.**

<sup>222</sup> WADA TD2004EAAS. 4. (2004). Reporting and evaluation guidance for testosterone, epitestosterone, T/E ratio and other endogenous steroids. [http://www.wada-ama.org/rtecontent/document/end\\_steroids\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/end_steroids_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.



**\*5H. T/E, T, and E Uncertainty  
LNDD Wrong in Reporting its Own Accuracy Standard**

Testing must be reliable (repeatable) and valid (accurate). Scientists accept that laboratory testing is inexact, although there are standards for acceptable inaccuracies.

The laboratory is inconsistent in its reporting of its own uncertainty.

**USADA0101 and USADA0288.**

In reporting Landis's testosterone and epitestosterone values, the laboratory claims an "incertitude" (measurement uncertainty) of 30% for the T/E ratio, 30% for epitestosterone, and 20% for testosterone.

Partie à remplir par le responsable

du rapport T/E (en surface) : 4

méthode) pour le rapport T/E : 30% pour l'Epitestosterone : 30% pour la Testosterone : 20%

basse du rapport T/E : 8 Résultat : ☒ normal : ☐ Inclassable : ☐ Négatif : ☐

haute du rapport T/E : 14.8.

Concentrations en Testosterone et Epitestosterone par la densité (cf doc E-INC-03) :

affichée	1.025	PARAPHÉ
du réfractomètre	2	
corrigée :	1.025	
de correction	0.24	
tration corrigée de Testosterone	45.4	
tration corrigée d'Epitestosterone	3.9	

Cet enregistrement est à archiver dans le dossier de confirmation

USADA 0101

**Figure 112. USADA0101. Document package declaration of measurement uncertainty of T/E, E, and T.**

**LNDD0617.**

The SOP specifies that correction should be made for the density (specific gravity) of the specimen.

According to the lab's own SOP, E-SUEIL-01, when the corrected epitestosterone level is less than 5 nanograms per milliliter, the measurement uncertainty is 50% for the T/E ratio, 40% for epitestosterone, and 20% for testosterone.

T/E (altérée par une administration de testo, androstenedione, DHEA)	2, 4	4 en et hors compétition	CG/SM IRMS	Estimé par une semi quantif CG/SM	Oui	CG/SM : +/- 30% si epi ≥ 5ng/mL (epi : +/- 30%, testo : +/- 20%) +/- 50% si epi < 5ng/mL (epi : +/- 40%, testo : 20%)	CG/SM : Si T/E < 3.1 : résultats dans les normes si 3.1 ≤ T/E < 5.7 : résultat inclassable si T/E ≥ 5.7 : résultat hors normes Si T/E < 2.7 : résultats dans les normes si 2.7 ≤ T/E < 7.9 : résultat inclassable si T/E ≥ 7.9 : résultat hors normes
LNDD ENREGISTREMENT							
Codification : E-SUEIL-01 Version : F Date : 22/03/2006 7/9							
Récapitulatif des seuils applicables au contrôle antidopage - Déclaration de résultats							
+/- 20%							
IRMS : +/- 0.8% IRMS : si Δδ > -3.0 : résultat dans les normes si -3.8 ≤ Δδ ≤ -3.0 : résultat inclassable si Δδ < -3.8 : résultat hors normes préciser en ab le rapport T/E estimé ainsi que les concentrations estimées et corrigées par la densité de testo et d'épitésto Si δ <sup>13</sup> C métabolites et/ou CER < -28‰ (sur la base du stéroïde non dérivé) : résultat hors norme							

**Figure 113. LNDD0617. SOP E-SUEIL-01 specifies that measurement uncertainty for urines with Landis's concentration of epitestosterone is 50% for the T/E ratio, 40% for epitestosterone, and 20% for testosterone.**

As Landis's concentration of epitestosterone is reported as 3.9 nanograms per milliliter, the laboratory erred in its reporting and estimate of its uncertainty.

## \*51. Poor Linearity Fitting Method Problematic

The LNDD method of forcing a fit through the origin is a poor technique.<sup>223</sup>

The linearity runs in the 'A' sample are poor.

In the first confirmation, the epitestosterone run is poor.

In the second confirmation, both the testosterone and epitestosterone runs are poor.

The linearity runs in the 'B' sample are better.

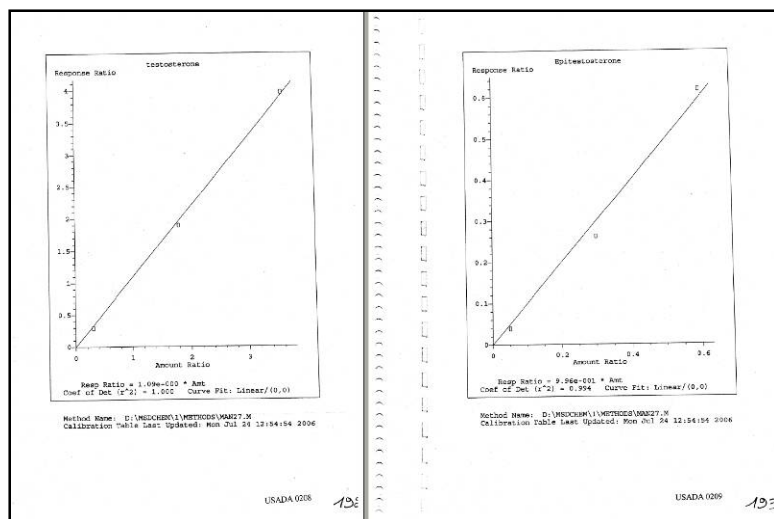


Figure 114. Linearity runs, 'A' sample, first confirmation. Epitestosterone (right) does not fit the line well. Testosterone (left) is okay.

223 Goldberger, B., et al. Commonly Practiced Quality Control and Quality Assurance Procedure for Gas Chromatography/Mass Spectrometry Analysis in Forensic Urine Drug-Testing Laboratories. Forensic Sci Rev 9:25. 60-80. (1997).  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

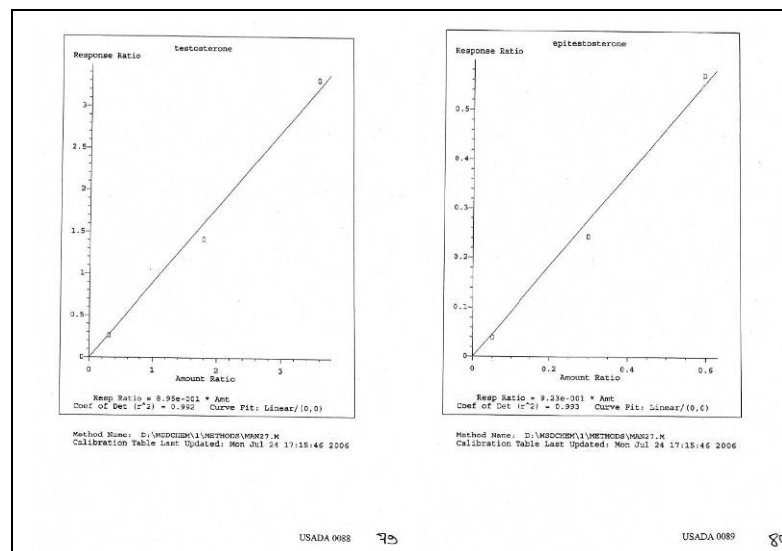


Figure 115. Linearity runs, 'A' sample, second confirmation. Both the testosterone (left) and epitestosterone (right) do not fit the line well.

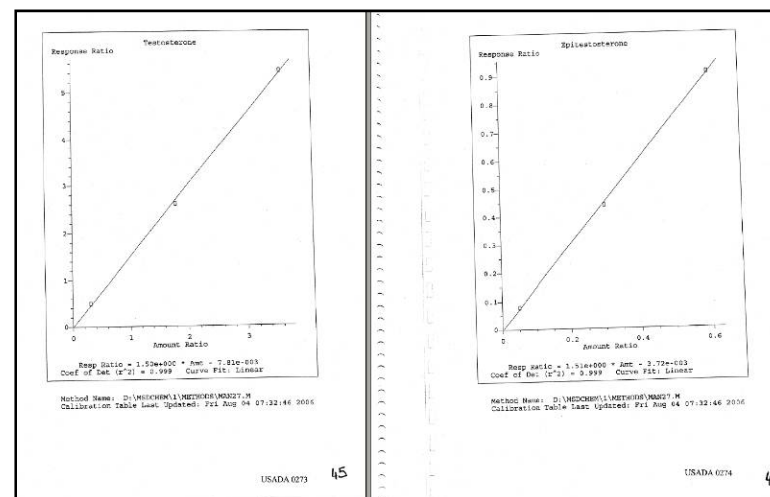


Figure 116. Linearity runs, 'B' sample, second confirmation. The fit is okay. Absolute values are problematic; see text.

**\*5J. Lab Cannot Quantify Reference Steroids  
Even Under Best Conditions, LNDD Gets it Wrong**

**USADA0086. USADA0207. USADA0270. USADA0288.**

The laboratory uses 17 $\alpha$ -methyltestosterone as an internal reference standard, a ruler if you will, by which to quantify (measure) the amount of other compounds.

In calibrating its equipment over a range of testosterone and epitestosterone concentrations, it adds precisely measured amounts of testosterone and epitestosterone to a “blank” or “clean matrix.”

These circumstances represent the “best case” for the laboratory to demonstrate its proficiency in measurement.

In determining the contents of an athlete’s urine, one expects much greater variability due to the more complex nature of an adult biological matrix.

USADA0288. Since under the worst circumstances, the laboratory must not be in error of more than 20% for testosterone and 30% for epitestosterone and the T/E ratio, one expects considerably better from the laboratory under the best circumstances.

The LNDD adds 100 ng/mL of 17 $\alpha$ -methyltestosterone to confirmation T/E aliquots. It then integrates the area under the 17 $\alpha$ -methyltestosterone peak and assigns that target response the established value of 100 ng/mL.

When a known quantity of testosterone or epitestosterone is added to the mix, the accuracy of the laboratory can be assessed in terms of the error in measuring a known amount.

**USADA0086.**

‘A’ sample calibration. One-half of measurements of testosterone and epitestosterone exceed 20% error rates. Testosterone itself exceeds the LNDD’s allowable error.

**USADA0207.**

‘A’ sample calibration. Two out of three T/E ratios exceed 20% error rates.

**USADA0270.**

‘B’ sample calibration. Every testosterone and epitestosterone measured value exceeds a 30% error rate against precisely spiked urines. Every testosterone and epitestosterone measurement exceeds the LNDD’s allowable error.

See the table on the next page.

Arnie’s comment:

These measurements, performed under the *best* circumstances, exceed the lab’s own stated accuracy guidelines for the *worst* circumstances.

The laboratory is shown to be unable to accurately measure testosterone and epitestosterone by its own standards.

Bottom line: The laboratory cannot accurately quantify reference steroids even under the best conditions.

Note that the level of T/E ratio uncertainty established by the LNDD (30%) is twice that of the Swiss laboratory (15%).

Is the figure given a measurement error established by the laboratory looking at its results in a reference situation?

Is it: (1) an attempt to reduce false positives, or (2) does it reflect the greater inaccuracy of the LNDD?

Simon Davis's comment:

I agree this is extremely poor.

Also, a round-robin test of doping labs' T/E analytical performance was published in 1996 (Catlin et al. Journal of Mass Spectrometry Vol. 31 397-402). The worst performing laboratory had an error of 20%.

The differences (in the table, 3<sup>rd</sup> column) in the responses clearly show major variations in the extraction efficiency between different aliquots.

	CH <sub>3</sub> T Added	CH <sub>3</sub> T Response	T Added	T Response	E Added	E Response	T/E Measured	T/E % Error	T Measured	T % Error	E Measured	E % Error
USADA0086	100	5915926	30	1557516	5	234336	<b>6.65</b>	<b>11%</b>	26	12%	<b>4.0</b>	<b>21%</b>
'A' sample	100	4981326	180	7052377	30	1211449	5.82	3%	<b>142</b>	<b>21%</b>	24.3	<b>19%</b>
Conf #2	100	5130998	360	17023691	60	2929592	5.81	3%	332	8%	57.1	5%
USADA0207	100	4680010	30	1359912	5	181309	<b>7.50</b>	<b>25%</b>	29	3%	<b>3.9</b>	<b>23%</b>
'A' sample	100	4212735	180	7964015	30	1100720	<b>7.24</b>	<b>21%</b>	189	5%	26.1	13%
Conf #1	100	5428625	360	21495301	60	3350917	6.41	7%	396	10%	61.7	3%
USADA0270	100	3782021	30	1845917	5	294592	6.27	4%	<b>49</b>	<b>63%</b>	7.8	<b>56%</b>
'B' sample	100	3011193	180	7860237	30	1324358	5.94	1%	<b>261</b>	<b>45%</b>	<b>44.0</b>	<b>47%</b>
	100	3783290	360	20557109	60	3442296	5.97	0%	<b>543</b>	<b>51%</b>	<b>91.0</b>	<b>52%</b>

Table 19. Testosterone and epitestosterone calibration. Even under the best circumstances, more than half of all testosterone, epitestosterone, and T/E ratios exceed 10% error rates. The LNDD has many percent errors exceeding 20%, even 30% in quantification. Errors exceeding 10% are in bold. Errors exceeding 20% are highlighted in yellow.

**\*5K. Confirmation Not in Triplicate ('A' Sample)**

**TD2004EAAS Violation<sup>224</sup>**

See also *Lack of Replicates* on page 132.

TD2004EAAS:<sup>225</sup>

“[C]onfirmation of elevated T/E values, concentration of testosterone, epitestosterone... is to be performed in triplicate.”

For T/E ratios, WADA rules require three confirmation tests for each sample in order to call it positive.

In the ‘A’ sample, replicates were unsatisfactory. Only two confirmation samples were run.

These two confirmation runs had widely different absolute testosterone and epitestosterone values—values so far apart as to invalidate the testing—even though the T/E ratios were similar.

In the ‘B’ sample, replicates were less than ideal. Three confirmation runs were made on the same batch.

Since the testing of the ‘A’ sample did not meet the WADA requirements for a positive T/E test, the ‘B’ sample cannot confirm a positive test.

**USADA0092. USADA0212.**

These appear to be the two confirmation analyses.

According to WADA Technical Document TD2004MRPL, the T/E ratio is listed in a table as a threshold substance.<sup>226</sup>

According to USADA0253, it appears that there was leftover urine from the ‘A’ sample. (Compare USADA0253 to USADA0254 where it is clearly stated that the ‘B’ sample has been exhausted: “Flacon vide—pas de remise sous scellé.”)

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<sup>224</sup> For more on the significance of ISL and other violations, see page 16.

<sup>225</sup> WADA TD2004EAAS. 2. (2004). Reporting and evaluation guidance for testosterone, epitestosterone, T/E ratio and other endogenous steroids. [http://www.wada-ama.org/rtecontent/document/end\\_steroids\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/end_steroids_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.

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<sup>226</sup> WADA Technical Document – TD2004MRPL. 2. (2204). [http://www.wada-ama.org/rtecontent/document/perf\\_limits\\_2.pdf](http://www.wada-ama.org/rtecontent/document/perf_limits_2.pdf). Accessed Dec 28, 2006.

**\*5L. Testosterone Level Not High ('B' Sample)**

**Landis's Level Normal**

**USADA0101.**

Landis's B-sample urinary testosterone concentration was 45.7 ng/mL. This is a normal value.<sup>227, 228</sup>

A high value, a value that creates a suspicion of doping, is >200 ng/mL.

In the Turnball case, a testosterone level of 373 ng/mL was deemed as not indicative of an adverse finding.

Arnie's comment:

Agreed that values below 200 ng/mL do not rule out doping. However, a not-high value is mitigating.

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<sup>227</sup> In a reference sample group of men, the mean testosterone was 44.6. Geyer, H. et al. The Cologne protocol to follow up high testosterone/epitestosterone ratios. RADA (4). 109. (1996). <http://proceedings.pulse180.de/>. Accessed Mar 1, 2007.

<sup>228</sup> In a reference sample group of sports students (n=105), the mean testosterone was 52. In a reference group of amateur cyclists (n=482), the mean testosterone was 42. Donike M., S. Rauth and A. Wolansky, Reference Ranges of urinary endogenous steroids determined by GC/MS, Proceedings of the 10th Cologne Workshop on Dope Analysis, 7th to 12th June 1992, M. Donike, H. Geyer, A. Gotzmann, U. Mareck-Engelke, S. Rauth eds., Sport und Buch Strauß. Köln. p. 72 and 74. (1992). USADA0917-USADA0926. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

## \*5M. Longitudinal Testing Reporting Error Prone

Don Catlin's testimony:<sup>229</sup>

There is nothing in the longitudinal profile to suggest a pattern of designer steroid use. (For Catlin's exact testimony, see page 385.)

### *Background*

"Evaluation of longitudinal studies: In males, the individual T/E values have been shown to vary from their mean value by less than 30% (screening values). The individual basal T/E value should be determined from at least three test results, excluding the suspicious result under consideration. If the suspicious test result, when compared to the basal value using appropriate statistical evaluation is found to be significantly different, that will constitute a proof of the administration of a source of testosterone. The comparison of screening results and confirmed results is acceptable."<sup>230</sup>

While longitudinal testing *may* be used as evidence of testosterone doping, the use of such examinations may be flawed for many reasons.

It is well known that single-event laboratory examinations are subject to error—for many reasons, including individual variability, errors in collection, storage, and analysis.

In Landis's 995474 sample, flawed analysis is a particularly compelling argument.

In AAA USADA v George Hartman, the panel noted: "it was improper to confirm a diagnosis... with only one... test."<sup>231</sup>

While admittedly not directly on point, the principle applies: One outlier test to make a diagnosis is well known in physiologic testing/medicine to be error-prone.

### *Collecting Longitudinal Data: Certifying Accuracy*

#### **USADA0547. USADA0563. USADA0606**

USADA0547. In collecting reports on 52 Landis specimens and compiling its longitudinal profile, USADA, in boilerplate language, asked laboratory directors to certify that the screen results are accurate.

Most labs complied, without questioning this boilerplate language.

USADA0563. At the UCLA laboratory, Paul Scott recognized a problem: screening data are inherently inaccurate.

He altered UCLA's response from:

"The screen results for these samples are accurate." to:

"The screen results for these samples have been verified and accurately reflect the values we have recorded in our original records for the samples."

Laboratory Director Don Catlin signed the form.

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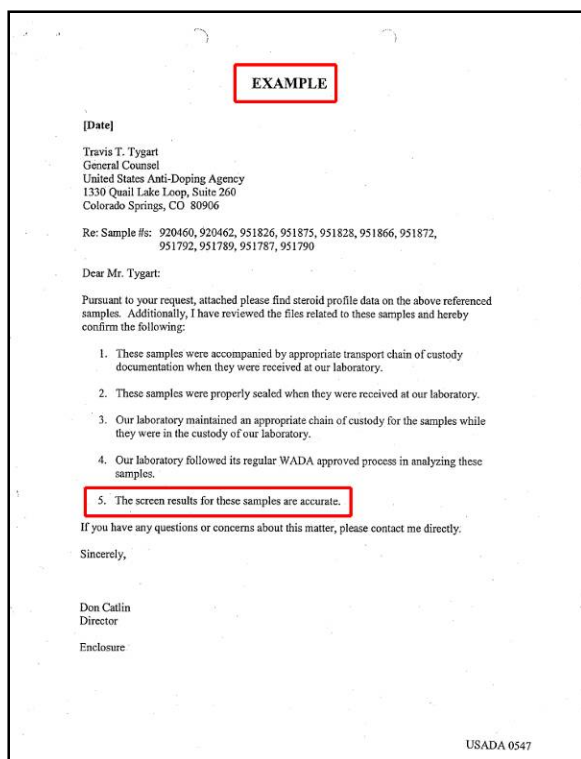
<sup>229</sup> A list of USADA's experts and their credentials is found starting on page 357.

<sup>230</sup> WADA TD2004EAAS. 4. (2004). Reporting and evaluation guidance for testosterone, epitestosterone, T/E ratio and other endogenous steroids. [http://www.wada-ama.org/rtecontent/document/end\\_steroids\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/end_steroids_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.

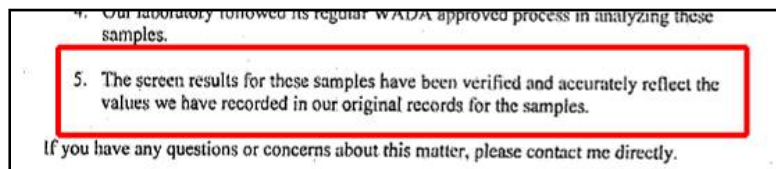
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<sup>231</sup> USADA v Hartman at point 7.4. [http://www.usocpressbox.org/usoc/pressbox.nsf/ac7bf642f496016a87256d0d006a340c/d418ed697d110391852572fb006e5eb3/\\$FILE/013.PDF](http://www.usocpressbox.org/usoc/pressbox.nsf/ac7bf642f496016a87256d0d006a340c/d418ed697d110391852572fb006e5eb3/$FILE/013.PDF). Accessed Jun 18, 2007.





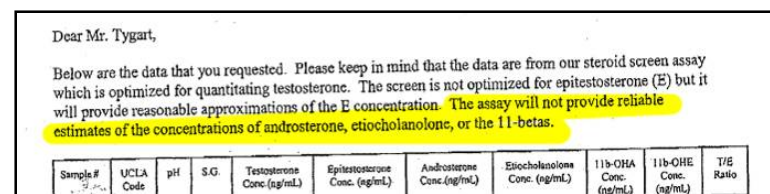
**Figure 117. USADA0547. Example of boilerplate language WADA laboratory directors were asked to sign, certifying that their screening results are accurate.**



**Figure 118. USADA0563. The UCLA laboratory alters the boilerplate language to reflect the reality that screening values are inherently *not* accurate.**

After Paul Scott left the UCLA laboratory, Service Manager Ana Reyes also noted the unreliability of the data:

“The screen is not optimized for epitestosterone (E) but it will provide reasonable approximations of the E concentration. The assay will not provide reliable estimates of the concentrations of androsterone, etiocholanolone, or the 11-betas.”



**Figure 119. USADA0606. The UCLA laboratory alters the boilerplate language to reflect the reality that screening values are inherently *not* accurate.**

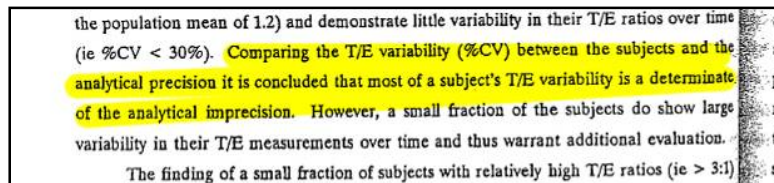
### **Landis's Sample 995474**

Landis's Stage 17 'A' sample was screened twice by LNDD. His T/E values were: 4.9 and 5.1.

Of 955 results in 2005 between 4 and 6, only 2 were confirmed by IRMS. (An additional single confirmation was made by longitudinal analysis. If this was the Turnball case, it was dismissed by the arbitrators.)<sup>232</sup>

This argues that a screening value of about 5 is likely to be an error or physiologic.

Baenziger<sup>233</sup> notes, "most of a subject's T/E variability is a determinate of the analytical imprecision."



**Figure 120. USADA0935. Baenziger. In longitudinal analysis, laboratory imprecision is a major factor.**

Here the LNDD's imprecision in T/E measurement between 4.9 and 11.4 argues against any confidence in using Tour de France 2006 Stage 17 data in any longitudinal evaluation.

Landis had screening values of 4.9 and 5.1. Had he had a third similar screening value performed, say of 5.0, we would face the absurd situation that considering his 11.4 confirmation value, he could be declared positive for testosterone based on longitudinal data from identical urine, an absurd situation.

<sup>232</sup> Delbeke, F. Report at the Anti-Doping Convention meeting of the Advisory Group on Science, Strasbourg. July 11, 2006. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>233</sup> Baenziger J. and L. Bowers, Variability of T/E ratios in Athletes, Proceedings of the 11th Cologne Workshop on Dope Analysis, 7th to 12th March 1993, M. Donike, H. Geyer, A. Gotzmann, U. Mareck-Engelke, S. Rauth eds., Sport und Buch Strausse Edition Sport, Koln. Page 44. (1994). Linked at: <http://arniebakercycling.com/books/wiki.htm>.

Arnie's comment:

In a sense, WADA and USADAA are arguing "Heads I win, tails you lose."

We prefer fairness: "What's good for the goose, is good for the gander."

The lab errors and wildly different measured absolute and T/E ratios are so far off that use of Stage 17 data is flawed.

### **Longitudinal Report. Wrong Date Stage 15**

The longitudinal Tour-stage data report that Stage 15 was on July 15<sup>th</sup>. It was on July 18<sup>th</sup>.

Arnie comment:

The laboratory has trouble keeping track of and accurately reporting longitudinal data.

### **Longitudinal Report Stage 17**

According to the longitudinal Tour stage document, Landis's T/E used in longitudinal analysis was 4.9.

According to Landis's official notification of the 'A' sample, his T/E was 11.4.

Arnie's comment:

1. The laboratory is inconsistent in its reporting
2. If the first screening of the 'A' sample had a problem with derivatization, it should have been thrown out. (The value should be that of the second screening, 5.1)

## Longitudinal Report Stage 15 and 19

The longitudinal Tour-stage data show that Stage 15 and Stage 19 T/E values are normal.

Arnie's comment:

As with the absolute testosterone amount, this does not rule out doping. However, it may be mitigating:

## Other Longitudinal Notes

Reported here and with actual longitudinal data values in Table 51, beginning on page 307:

I count 52 tests.

The UCI summarizes tests, incompletely (often with 0 for an unreported value) on USADA0492 through USADA0494.

Samples commented on below are highlighted in yellow in Table 51.

## Inconsistencies

Throughout the discovery documents, USADA often makes several repeated requests to the labs for records. Labs often report results more than once.

## LNDD0011 and LNDD0012.

Consecutive pages from discovery show differing results from sample 994276. It is the same run of the same aliquot of the same sample, yet the epitestosterone value is reported differently.

No handwritten cross-out, initial, or date, indicate or explain the difference. Both of these values, 1.5 and 2.0, appear in different longitudinal reports for the LNDD. Which is the correct value? How do we know?

LNDD0011

Donneur: [redacted]  
Date: 16/07/2006  
Cycliste: [redacted]  
Echantillon: [redacted]  
Sérial: [redacted]  
Valeur: [redacted]  
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Table 20. LNDD0011 (left) and LNDD0012 (right). Same test. Different T/E results. Moreover, different results reported in different longitudinal reports. Which is the correct value?

*Inconsistencies or errors in T/E ratios and dates are found only in reports from LNDD:*

- 176593 sample is reported as **1.3** on USADA0582 and reported as **1.2** on USADA0492, USADA0559, and USADA0575.
- 289130 sample is reported as **1.3** on USADA0582 and reported as **0.9** on USADA0492, USADA0559, USADA0575, and USADA0622.
- 808345 sample is reported as **1.3** on USADA0582 and reported as **0.9** on USADA0492, USADA0559, and USADA0575.
- 994075 sample is incorrectly reported as having been acquired on July **15**, 2006 on USADA0405. The stage took place on July **18**, 2006.
- 994276 sample is reported as **1.5** on USADA0405 and reported as **2.0** on USADA0506 and USADA0709.

There are two values reported for epitestosterone: 17 on LNDD0011, associated with a T/E of 1.5; and 24 on LNDD0012 with an overwritten, handwritten T/E of 2.0—which appears high given the measured amounts of T (21.5) and E (24.2).

- 995474 sample is reported as 4.9 on USADA0405, 11 on USADA0390, and as 11.4 on USADA0375. The reported value on USADA0494 is hard to read, 11.?

951789 sample from the UCLA laboratory is listed on USADA0564, USADA0493, and USADA0693. It is listed with a different number, 951786, on USADA0536.

#### Tour de France 2006

- Tour de France 2006 values from the LNDD are tabled on USADA0405 and USADA0410.
- Both tables list the T/E for sample 995474 as 4.9.
- 994276 sample was reported as suspicious for etiocholanolone and the diols on USADA0404.
- 995462 sample has a 5 $\alpha$ 3a diol value of 14 listed on USADA0415 and a value of 17 listed on USADA0405.
- 995474 values in LNDD tables are a mélange of values obtained in the first (incomplete derivatization) screening and the rescreening. There is some note of this on the table on USADA0410, but not on the table on USADA0405.
- 994277, 995474, and 994080 (at least three LNDD samples from the Tour de France 2006) had derivatization problems, although these problems were not always reported on the longitudinal data files. These are in ***bold italics***.

#### IRMS

At least three IRMS studies were performed.

These samples numbers are in **bold**:

- 995474, the index sample, Stage 17 TDF, at LNDD, in **bold red**.
- 497104 and 1501850, two out-of-competition post-Tour samples performed at the UCLA laboratory.

#### Other Notes

- 497104 sample data for androsterone, etiocholanolone, and diols are unreliable, according to the lab. (USADA0606 and USADA0607.)
- 874535 sample had a derivatization problem noted on USADA0581, USADA0582, and USADA0647.

## 6. IRMS: Carbon Isotope Test

### IRMS (Isotope Ratio Mass Spectrometry) Introduction

- This test is designed to detect synthetic (exogenous) testosterone use. (From a semantic point of view, that is the purpose of the T/E test as well.)
- Practically speaking, an abnormal IRMS test is necessary and sufficient to confirm doping.
- Accurate testing requires accurate (1) identification and (2) quantification of compounds.
- In nature, about 99% of carbon is in the form of carbon-12 ( $^{12}\text{C}$ , 6 protons and 6 neutrons). About 1% is carbon-13 ( $^{13}\text{C}$ , 6 protons and 7 neutrons).
- Very slight differences in this one-to-a-hundred ratio occur in plants and in animals.
- Many synthetic testosterone products are soy-based.
- With doping, testosterone in the urine may reflect the synthetic origin or the natural production of testosterone.
- The slight differences between the carbon-13 to carbon-12 plant and animal ratios form the basis of testing for synthetic testosterone.
- The relative amount of  $^{13}\text{C}$  to  $^{12}\text{C}$  is reported in delta ( $\delta$ ) units, in parts per thousand (‰, parts per mil).
- Each of these metabolites is compared to non-testosterone reference steroids also present in the athlete's sample (This technique helps control for diet variation between athletes. The reference steroids are subtracted from the metabolite values, and are also called delta/delta values.)
- The level at which these subtraction values are considered abnormal varies from laboratory to laboratory.
- Laboratories typically consider subtraction values abnormal when the difference between the testosterone metabolite and the reference steroid is between 3 and 4 delta units.

- Labs typically can accurately measure to between 0.5 and 1.0 delta unit accuracy.
- The IRMS test looks at the relative amount of carbon-13 and carbon-12 in two or four testosterone metabolites (some labs look at two, some look at four).
- If a laboratory looks at two metabolites, it does not look at *any* two of the four metabolites. It either looks at the pair of [etiocholanolone and androsterone] or at the pair of [5-beta androstanediol and 5-alpha androstanediol].
- If two metabolites are used to call a test abnormal, considering metabolic pathways, they must be two from the same pair.
- Whether one, two, or four subtraction values must be abnormal to call a test positive may be a case-dispositive argument.

For more information about IRMS testing theory, see page 287.

“Carbon isotope ratio analysis... there remains, however, a clear need for WADA accredited laboratories to improve the use and understanding of this technique...”<sup>234</sup>

Contrast the previous statement to:

“Jacques De Ceaurriz, the Châtenay-Malabry chief, said the synthetic testosterone was found in isotope testing.

‘It’s foolproof. This analysis tells the difference between endogenous and exogenous,’ he told the AP. ‘No error is possible in isotopic readings.’”<sup>235</sup>

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<sup>234</sup> Cawley, A., et al. Pure and applied aspect of carbon isotope ratio analysis in doping control. RADA (12). Sport und Buch Strauß. Köln. 231-240. (2004).

<http://proceedings.pulse180.de/>. Accessed Mar 1, 2007.

<sup>235</sup> Jerome Pugmire. AP. In AOL Sports. August 5, 2006. [http://sports.aol.com/tourdefrance/story/\\_a/second-landis-doping-sample-tests/20060805050309990001](http://sports.aol.com/tourdefrance/story/_a/second-landis-doping-sample-tests/20060805050309990001). Accessed Mar 19, 2007.

## ISL Violation<sup>236</sup>

ISL 5.2.6.1:<sup>237</sup>

“The Laboratory must have documented procedures to ensure that it maintains a coordinated record related to each Sample analyzed. In the case of an Adverse Analytical Finding, the record must include the data necessary to support the conclusions reported (as set forth in the Technical Document, Laboratory Documentation Packages). In general, the record should be such that in the absence of the analyst, another competent analyst could evaluate what tests had been performed and interpret the data.”

Arnie's comment:

A fundamental observation:

LNDD performed the IRMS test so badly, in so many ways, that other competent analysts (for example, Wolfram Meier-Augenstein) cannot interpret the data.

Arnie's comment:

Science is not foolproof. There is always some uncertainty.

The methods employed by LNDD are particularly subject to error. For background information about GC/MS and GC/C-IRMS testing, see *Appendix G: Test Procedures and Problems* on page 313.

<sup>236</sup> For more on the significance of ISL and other violations, see page 16.

<sup>237</sup> WADA International Standard for Laboratories. 5.2.6.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

## Analysis Introduction: LNDD Performed the IRMS Badly

- Many of the procedural arguments, starting on page 93, also apply to the IRMS test.
- There are so many obvious *procedural* lab errors in the T/E analysis, especially in the ‘A’ sample, that the general proficiency of the laboratory to conduct *any* testing can be challenged.
- There are basic questions about the integrity of the processed urine. Some of these questions are discussed starting on page 134. Some of these questions are discussed in the T/E section.

For example, chemical processing, including *derivatization*, problematic in these analyses, is discussed in the T/E section. The LNDD has provided no evidence that derivatization was not problematic in the IRMS test.

For example, there is no validation study/proof that IRMS diol assays are accurate in the presence of *contamination/degradation*.

There is evidence, from the presence of deuterated androsterone, that a serious *cross-contamination* issue exists in the LNDD.

- Accurate testing requires accurate (1) identification and (2) quantification of compounds. As performed by LNDD, identification was inadequate to proceed with quantification.
- An accurate test requires proper processing of the sample. Common problems include:
  - i) Poor system linearity.
  - ii) Incomplete combustion.
  - iii) Poor vacuum/leakage.

Arnie's comment:

Results may be as much art as science.

Using simple manipulation in processing, Simon Davis was able to get delta values that were originally recorded as between -4.50‰ and 16.66‰ to shift to values between -420‰ and 490‰.



### \*\*\*Compound Specific Isotope Analysis Requirements<sup>238</sup>

Since GC/C-IRMS converts sample peaks into CO<sub>2</sub>, compound identifying characteristics (other than gas chromatographic characteristics) are lost.

To avoid ambiguity concerning peak (compound) identification, CSIA for doping control (or any forensic application) is best carried out on a GC/MS-C-IRMS hybrid system—that is, a system that permits “simultaneous” mass spectrometric identification of peaks for which delta carbon-13-values are sought during the same analytical run.<sup>239, 240, 241, 242, 243</sup>

In the absence of such a hybrid system, peak identification between a GC/MS chromatogram and a GC/C-IRMS chromatogram system is only acceptable if the following conditions are met:

1. Sample preparation for GC/C-IRMS and GC/MS analysis is identical: that is, it is based on the same (sub)sample of parent material, uses the same extraction/purification protocol (if applicable), and the same derivatization protocol. In other words,

an aliquot is taken and prepared ready for injection and subsamples are injected on either instrument.<sup>244</sup>

2. Chromatographic conditions should be as identical as possible: that is, identical GC columns of identical column dimensions and stationary phase (type, polarity and film thickness), ideally from the same manufacturing batch; identical injector conditions; identical carrier gas management (ideally constant flow mode through electronic pressure control); and identical temperature program.<sup>245</sup>
3. Good chromatography—resulting in baseline separation of all target compounds, internal standard(s), and internal reference materials (see below)—is essential.<sup>246</sup>
4. Retention index (relative retention time) instead of retention time should be used to determine peak identity. To this end, an internal standard should be added to the sample prior to sample preparation. If the right choice of standard is made, this internal standard could also be used for peak (compound) quantification by GC/MS. The same standard could also serve as internal reference material (of known delta carbon-13-value) for GC/C-IRMS analysis.<sup>247</sup>

Due to the known issue of delta carbon-13 offset in GC/C-IRMS when reference gas pulses are exclusively used for isotopic calibration, two internal reference materials (RM) should be added to the sample—ideally prior to sample preparation, at a minimum prior to injection.<sup>248, 249, 250, 251, 252</sup>

<sup>238</sup> Adapted from a Wolfram Meier-Augenstein letter, April 10, 2007. For background information about GC/MS and GC/C-IRMS chromatography, see *Appendix G: Test Procedures and Problems* on page 313.

<sup>239</sup> Hall, J. A., Barth, J. A. C., & Kalin, R. M. Routine analysis by high precision gas chromatography mass selective detector isotope ratio mass spectrometry to 0.1 parts per mil. *Rapid Communications in Mass Spectrometry*, vol. 13, no. 13, pp. 1231-1236. (1999). <http://www3.interscience.wiley.com/cgi-bin/abstract/62003715/ABSTRACT?CRETRY=1&SRETRY=0>. Accessed May 1, 2007.

<sup>240</sup> Meier-Augenstein, W. Use of gas chromatography-combustion-isotope ratio mass spectrometry in nutrition and metabolic research. *Current Opinion in Clinical Nutrition and Metabolic Care*, vol. 2, no. 6, pp. 465-470. (1999). Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>241</sup> Meier-Augenstein, W. Online recording of c-13 c-12 ratios and mass-spectra in one gas-chromatographic analysis. *Hrc-Journal Of High Resolution Chromatography*, vol. 18, pp. 28-32. (1995). Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>242</sup> Meier-Augenstein, W., Brand, W., Hoffmann, G. F., & Rating, D. Bridging the information gap between isotope ratio mass-spectrometry and conventional mass-spectrometry. *Biological Mass Spectrometry*, vol. 23, pp. 376-378. (1994). Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>243</sup> The LNDD failed to employ this quality assurance procedure.

<sup>244</sup> The LNDD failed to employ this quality assurance procedure.

<sup>245</sup> The LNDD failed to employ this quality assurance procedure.

<sup>246</sup> The LNDD chromatography is *not* good.

<sup>247</sup> The LNDD failed to employ this quality assurance procedure.

<sup>248</sup> Caimi, R. J. & Brenna, J. T. Direct analysis of carbon isotope variability in albumins by liquid flow-injection isotope ratio mass spectrometry. *Journal of the American Society for Mass Spectrometry*, vol. 7, pp. 605-610. (1996). <http://www.ingentaconnect.com/content/els/10440305/1996/00000007/00000006/art00010>. Accessed May 1, 2007.



One of these internal RM's may be identical to the internal standard mentioned in point 3 above. The delta carbon-13 values of both RM's should be known (underivatized as well as derivatized) and both RM's should meet certain criteria.<sup>253, 254</sup>

Internal RM-1 should preferably elute before any of the target compounds while internal RM-2 should preferably elute after any of the target compounds.<sup>255</sup>

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<sup>249</sup> Caimi, R. J., Houghton, L. A., & Brenna, J. T. Condensed-phase carbon isotopic standards for compound-specific isotope analysis. *Analytical Chemistry*, vol. 66, pp. 2989-2991. (1994).  
[http://www.ncbi.nlm.nih.gov/sites/entrez?cmd=Retrieve&db=PubMed&list\\_uids=7978298&dopt=Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?cmd=Retrieve&db=PubMed&list_uids=7978298&dopt=Abstract). Accessed May 1, 2007.

<sup>250</sup> Meier-Augenstein, W. Applied gas chromatography coupled to isotope ratio mass spectrometry. *Journal of Chromatography A*, vol. 842, no. 1-2, pp. 351-371. (1999).  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>251</sup> Merritt, D. A. & Hayes, J. M. Nitrogen isotopic analyses by isotope-ratio-monitoring gas-chromatography mass-spectrometry. *Journal of the American Society for Mass Spectrometry*, vol. 5, pp. 387-397. (1994).  
[http://www.ncbi.nlm.nih.gov/sites/entrez?cmd=Retrieve&db=PubMed&list\\_uids=11539439&dopt=Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?cmd=Retrieve&db=PubMed&list_uids=11539439&dopt=Abstract). Accessed May 1, 2007.

<sup>252</sup> The LNDD failed to employ this quality assurance procedure.

<sup>253</sup> Caimi, R. J., Houghton, L. A., & Brenna, J. T. Condensed-phase carbon isotopic standards for compound-specific isotope analysis. *Analytical Chemistry*, vol. 66, pp. 2989-2991. (1994).  
[http://www.ncbi.nlm.nih.gov/sites/entrez?cmd=Retrieve&db=PubMed&list\\_uids=7978298&dopt=Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?cmd=Retrieve&db=PubMed&list_uids=7978298&dopt=Abstract). Accessed May 1, 2007.

<sup>254</sup> The LNDD failed to employ this quality assurance procedure.

<sup>255</sup> The LNDD failed to employ this quality assurance procedure.

## Does LNDD Have Identification Criteria?

### ISL Violation<sup>256</sup>

ISL 5.4.4.3.1:<sup>257</sup>

“The Laboratory must establish criteria for identification of a compound *at least as strict* as those stated in any relevant Technical Document.”

TD2003IDCR:<sup>258</sup>

“The laboratory must establish criteria for the identification of a compound.”

USADA and its experts have presented a shifting explanation about how identification was performed.

- *Before the arbitration*, according to USADA’s pre-hearing brief, August 16, 2006, point 41, page 19, the identification method used by the LNDD is that of two machine (GC/MS and GC/C-IRMS) analysis: “41. The second of the three steps in the LNDD IRMS test is pre-IRMS compound identification by GC-MS, the gold standard for compound identification in analytical chemistry applications. GC separates the compounds present in a mixture and MS identifies them. The first element of compound identification is the GC “retention time (RT)” and the second one is the molecular fingerprint recorded by the MS, which fragments the molecule into ions. Compound identification is achieved by matching GC retention times and MS ion patterns (ion ratios) between the compound in the sample and a reference standard.”

<sup>256</sup> For more on the significance of ISL and other violations, see page 16.

<sup>257</sup> WADA International Standard for Laboratories. 5.4.4.3.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>258</sup> WADA TD2003IDCR. 1. (2003). Identification criteria for qualitative assays incorporating chromatography and mass spectrometry. [http://www.wada-ama.org/rtecontent/document/criteria\\_1\\_2.pdf](http://www.wada-ama.org/rtecontent/document/criteria_1_2.pdf). Accessed Dec 28, 2006.

- *At the AAA hearing*, USADA’s expert Brenna first testified *for* the retention time identification:<sup>259</sup>

AAA Hearing Transcript Page 255  
16 Q. And how would I know which is which,  
17 because they just have numbers at the top.  
18 A. Well, they have retention times that  
19 match on the previous -- with the previous  
20 GC/MS, and the GC/MS delivers structural  
21 information, like aliquots and so forth, that  
22 tell us which is which.

- *At the AAA hearing*, when the failure of this method was exposed, USADA’s expert Brenna then testified *against* the retention time identification and *changed* his identification theory to peak pattern matching:

AAA Hearing Transcript Page 1971  
6 A. You can’t use relative retention  
7 times.  
14 A. Well, on the GC/MS side, we see a  
15 pattern, so we can see peak heights. And so --  
16 and we want to look at the overall pattern is  
17 what -- an intermediate-sized peak; a small  
18 peak; this is one of the strong peaks; and then  
19 a large one. And then we move over a bit, and  
20 we find a large peak, an intermediate peak, a  
21 smaller peak. And then we move to the end, and  
22 we see a large peak.

- *At the CAS hearing*, the explanation shifted to a combination method of GC/MS peak matching and blank urine/sample matching.

Mongongu and Frelat, who indicated that they performed, and described *different* versions of this peak-matching and blank-urine method, both noted that *there is no SOP* for their procedures.<sup>260</sup>

<sup>259</sup> The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>260</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

The only validation of the method, as described by Mongongu, is her own verification. There is no LNDD laboratory sign-off on this method, there is no COFRAC or outside audit of the method.

Despite being expansive and initially claiming this method is widely-used, Mongongu cannot cite a single peer-reviewed article that discusses peak-matching as a valid method.

I find it interesting that USADA attorney Dunn asks Landis attorney Suh to provide the SOP for peak matching to the Mongongu, when USADA/LNDD never provided it to Landis, despite numerous requests.

Here is Mongongu's testimony at the CAS hearing:

CAS Hearing Transcript Page 660

1 CYNTHIA MONGONGU - CROSS  
5 Q. And what does your SOP about  
6 peak matching say?  
7 MR. DUNN: *Excuse me, can we*  
8 *get the SOP to the witness* so she can  
9 answer the question with the document.  
10 MR. SUH: *We've never been*  
11 *provided with an SOP on peak matching.*  
12 A. The SOP on the  
13 identification of GC/MS -- GC/MS and  
14 then the SOP on, on the analysis on the  
15 IRMS analysis. We have an SOP for  
16 GC/MS and we have an SOP for IRMS  
17 analysis.  
18 Q. That's not my question. My  
19 question is tell us what the SOP on how  
20 you conduct peak matching, what it  
21 says? What does your SOP about peak  
22 matching say? How does it say you do  
23 it?  
24 A. *There is no SOP for the*  
25 *matching test.*

CAS Hearing Transcript Page 661

1 CYNTHIA MONGONGU - CROSS  
16 Am I correct to understand  
17 that there is no SOP on how to conduct  
18 peak matching?  
19 A. *There is no SOP for this*  
20 *matching.*

21 Q. So your method therefore for  
22 peak matching is not validated,  
23 correct?  
24 A. No, it's not correct. The  
25 method is validated.

CAS Hearing Transcript

Page 662

1 CYNTHIA MONGONGU - CROSS  
2 Q. And who validated the  
3 method?  
4 A. I personally did validation  
5 of this method.  
6 Q. So you validated your own  
7 method?  
8 A. When you say my own methods,  
9 I'm talking about the methods that are  
10 used in the lab and yes, I validate  
11 those methods.  
12 Q. And what do you mean by  
13 validate in this context?  
14 A. When I validate this method  
15 I did analysis of several urines which  
16 I analyzed using GC/MS with the  
17 temperature program that's used with  
18 GC/MS and the temperature program used  
19 with IRMS to see if the two match.  
20 Q. Have you validated this  
21 method with anyone outside of LNDD?  
22 A. I don't know what you mean  
23 by on the outside.  
24 Q. Has anyone validated that  
25 method who is not working for LNDD?

CAS Hearing Transcript

Page 663

1 CYNTHIA MONGONGU - CROSS  
2 A. I am the person who verifies  
3 the method.  
4 Q. And you validated that  
5 method when you were an employee of  
6 LNDD, correct?  
7 A. Absolutely, yes.  
8 Q. That method is not accredited  
9 or part of your accreditation, is it,  
10 peak matching?  
11 A. Yes, it is part of the  
12 accreditation.  
13 Q. And your accreditation, you  
14 are saying that your IRMS accreditation  
15 included peak matching; is that  
16 correct?  
17 A. Yes, contrary to what I told

18 you before.  
19 MR. PAULSSON: No, no. In  
20 accordance or through what I told you  
21 before.  
22 A. In accordance with what I  
23 told you before.  
24 THE INTERPRETER: Excuse me.  
25 Q. And you are saying it is

CAS Hearing Transcript

Page 664

1 CYNTHIA MONGONGU - CROSS  
2 accredited notwithstanding the fact  
3 that there is no SOP on peak matching?  
4 A. Yes.  
5 Q. Your testimony is you use  
6 peak matching every time you conduct  
7 the IRMS test, correct?  
8 A. Yes, as well as the blank  
9 urine testing comparison.

CAS Hearing Transcript

Page 672

1 CYNTHIA MONGONGU - CROSS  
2 this method; is that correct?  
3 A. I'm repeating to you what I  
4 said before which is that it's not  
5 uncommon to see these two methods used  
6 through my professional experience and  
7 I think because I have worked on this  
8 that it's normal. People who do IRMS  
9 analysis --  
10 Q. There are no -- sorry.  
11 A. Yes, among people who do the  
12 IRMS analysis.  
13 Q. **Can you identify any**  
14 **peer-reviewed article** that talks about  
15 peak matching as a validated method for  
16 identification of metabolites?  
17 A. **No**, I don't right off the  
18 top of my head have knowledge of any  
19 such article.

CAS Hearing Transcript

Page 677

1 CYNTHIA MONGONGU - CROSS  
2 Q. Do you have an SOP, **does**  
3 **LNDD have an SOP on the blank urine,**  
4 use of the blank urine and the use of  
5 the relative retention time technique  
6 or method to identify testosterone  
7 metabolites?  
8 A. **No**. [Emphasis added.]

Now Frelat, at the CAS hearing, testifies that there is no SOP for her method.

CAS Hearing Transcript

Page 830

1 CLAIRE FRELAT - DIRECT  
7 Q. And while that's coming up,  
8 it will take probably a minute to pull  
9 those up, Ms. Frelat, let me ask you a  
10 question. **There's no SOP on this first**  
11 **step, is there, this peak pattern**  
12 **matching step?**  
13 A. **No, there is no SOP.** No  
14 operation manual. [Emphasis added.]

Arnie's comment:

Assuming the LNDD identification criteria are those described by Brenna, do they meet the requirements of TD2003IDCR? No.

Not only were we not provided with the method of identification of metabolites used in IRMS, testimony of Mongongu and Frelat at CAS showed that none exists. There is no written documentation (SOP) of the method used by the laboratory operators.

There is testimony that whatever method is used has not been independently validated or accredited.

## Identification Failure

As we will see in the following pages, LNDD did not properly identify compounds in Landis's urine.

Accurate peak identification is always important. Peak identification might be expected to be especially critical in Landis, due to his TUE use of corticosteroids for his osteoarthritic hip. Pujos has shown that corticosteroid intake reduces the excretion of some androgen steroids and leads to the appearance of other compounds.<sup>261</sup>

1. Different chromatographic columns were used in the GC/MS and GC/C-IRMS. There can be no assurance that the compounds eluted in the IRMS portion were even in the same order as in the GC/MS portion. For details, see page 188.
2. Bad chromatography characterized the testing of Landis's sample, especially the diol analysis. For details, see page 197.
3. The LNDD cannot accurately identify its own internal standard. For details, see page 201.
4. The computer data files cannot be processed within the LNDD's own stated accuracy budget for the *entire* analysis. For details, see page 206.
5. Retention times of the *Mix Ac 50* are not within WADA's acceptable standard. For details, see page 185.
6. Note: The *Mix Cal Acetate*, as on USADA0354, is used in the IRMS process to help verify the calibration of the instrument. It *cannot* be used in identification because there is no 5-alpha androstenediol, no androsterone, and no pregnanediol in the mix.

Further, using retention times from the Mix Cal Acetate is fraught with the same general problems previously discussed in GC/MS and T/E identification: retention time alone is

insufficient—that is the reason for performing at least three-ion identification as discussed on page 152.

7. Note: The blu ("blank," negative control sample) urine cannot be used in identification. Repeated testing by LNDD (LNDD0308-0311) provides a measure of the lab's precision, not accuracy.

The blu urine cannot be used because there is no known LNDD method whereby LNDD could identify compounds in the blu urine *originally*.

If GC/MS analysis was used (it was performed, as noted on LNDD0309), we have no assurance that this analysis was performed better than the failed analysis in Landis 995474 noted in points 1-4 above. If not GC/MS, then what method was used to identify compounds? Furthermore, if another method was used, why was this method not used in Landis? Alternatively, did the LNDD use another blu urine whose compound identities were determined from yet another blu urine...creating a "broken telephone" analysis.

Again, using retention times from the blu urine is fraught with the same general problems previously discussed in GC/MS and T/E identification: retention time alone is insufficient—that is the reason for performing at least three-ion identification as discussed on page 152.

Arnie's comment:

Without accurate compound identification, there can be no quantification.

Without accurate compound identification, there can be no meaningful analysis.

There was no accurate compound identification.

The LNDD analysis is meaningless.

<sup>261</sup> Pujos, E., et al. Optimizing the extraction and analysis of DHEA sulfate, corticosteroids and androgens in urine: application to a study of the influence of corticosteroid intake on urinary steroid profiles. *Anal Bioanal Chem.* 380, 524-536. (2004).

**\*\*\*6A. Bad Identification: Lack of Machine Coupling  
Lack of Hybrid GC/MS / GC/C-IRMS System**

See the article *Compound Specific Isotope Analysis Requirements* on page 178.

The determination of isotopic values depends upon the IRMS component of the analysis.

The identification of the compounds being analyzed is made in the GC/MS component of the test.

In the analysis of Landis's samples, these determinations are made on a separate machine.

In best laboratory practice, these machines are coupled—so that retention time and relative retention time can be accurately translated to the IRMS machine.

**\*\*\*6B. Bad ID: Retention Time Shift: 995474**

**GC/MS vs. GC/C-IRMS**

**No Identification = Case Dispositive**

**ISL Violation<sup>262</sup>**  
**TD2003IDCR Violation**

TD2003IDCR:<sup>263</sup>

“[T]he retention time of the analyte shall not differ by more than one percent or  $\pm 0.2$  minutes (which ever is smaller) from that of the same substance in a spiked urine sample.”

**USADA0309. USADA0313. USASDA0317. USADA0321.**

**USADA0351. USADA0354.**

See also *Compound Specific Isotope Analysis Requirements* on page 178.

The *Mix Ac 50* analyzed on the GC/MS *must* provide the information on relative retention times necessary for analyte identification. If the relative retention times do not match, there can be no adequate identification of these compounds.

The *Mix Cal Acetate*, as on USADA0354, is used in the IRMS process to help verify the calibration of the instrument. It *cannot* be used in identification because there is no 5-alpha androstenediol, no androsterone, and no pregnanediol in the mix.

Further, using retention times from the Mix Cal Acetate is fraught with the same general problems previously discussed in GC/MS and T/E identification: retention time alone is insufficient—that is the reason for performing at least three-ion identification as discussed on page 152.

Keep in mind that many GC/C-IRMS systems use a dual-inlet system in which the GC portion for identification is directly coupled to the IRMS instrument, rather than using two separate processes as at LNDD.

Here the relative retention times are approximately 6 times larger than acceptable.

The discrepancy in the ‘A’ sample is similar.

***Therefore, substances cannot be identified according to minimum standards and the analysis must be discarded.***

Relative Retention Time	GC/MS			GC/C-IRMS	
	Mix	995474	% Diff	Sample	% Diff
5α Andro AC					
Etio	1.343	1.346	0.22	1.426	6.2
Andro	1.368	1.371	0.22	1.456	6.4
5β-Adiol	1.420	1.418	-0.14	1.512	6.5
5α-Adiol	1.457	1.452	-0.34	1.551	6.5
11K-Etio	1.597	1.596	-0.06	1.712	7.2
Pdiol	1.796	1.791	-0.28	1.917	6.7

**Table 21. Relative retention times. ‘B’ sample. The “mix” is the Mix Ac 50. Percent difference for relative retention time is relative to the mix. The relative retention time difference should not exceed 1%.**

<sup>262</sup> For more on the significance of ISL and other violations, see page 16.

<sup>263</sup> WADA TD2003IDCR. 1. (2003). Identification criteria for qualitative assays incorporating chromatography and mass spectrometry. [http://www.wada-ama.org/rtecontent/document/criteria\\_1\\_2.pdf](http://www.wada-ama.org/rtecontent/document/criteria_1_2.pdf). Accessed Dec 28, 2006.



**\*\*\*6C. Bad ID: Retention Time Shift: Retesting  
No Identification = Case Dispositive**

**ISL Violation<sup>264</sup>  
TD2003IDCR Violation**

TD2003IDCR:<sup>265</sup>

“[T]he retention time of the analyte shall not differ by more than one percent or  $\pm 0.2$  minutes (which ever is smaller) from that of the same substance in a spiked urine sample.”

**LNDD1780. LNDD0178. LNDD1787.**

**USADA0160. USADA0166. USADA0172**

The LNDD provided data about its ten positive ‘A’ samples tested in 2006. The first 2006 positive, sample 326579, was carried out on February 21, 2006.

Two 326579 F3 runs were performed (LNDD1784 and LNDD1786). The operator marked retention times with dashes.

LNDD calculated the delta/delta values (5 $\beta$ -Adiol – Pdiol and 5 $\alpha$ -Adiol – Pdiol) based on two different analyses (acquisition times 15:18:42 and 16:07:54), a bad laboratory practice.

Relative retention times are calculated as RT analyte x / RT internal standard. Percentage changes were calculated relative to the earlier analysis.

The values indicate that between sample 326579 and Landis’s sample, retention times for all key metabolites decreased by more than one minute. This usually means separation gets worse. The retention time of the internal standard did not change.

The shift in retention times between February and July (though not for the internal standard) extends to all runs (F1, F2 and F3). See Table 22.

Sample Name	RT IS	5 $\beta$ -Adiol	5 $\alpha$ -Adiol	Pdiol	Bates
326579 F3	867.9	1375.9	1409.4	1744	LNDD1784
995474 F3	867.4	1304.7	1337.2	1652	USADA0172
RT Change (sec)	0.5	71.2	72.2	92	
% Difference		5.1	5.1	5.2	
		Etio	Andro		
326579 F2	869.1	1291.2	1328.8		LNDD1782
995474 F2	866.0	1229.7	1254.3		USADA0166
RT Change (sec)	2.5	61.5	74.5		
% Difference		4.4	5.3		
		11K-Etio			
326579 F1	869.0	1573.7			LNDD1780
995474 F1	867.0	1478.2			USADA0160
RT Change (sec)	2.0	95.5			
% Difference		5.9			

**Table 22. Retention time shift from February 2006 to July 2006 of roughly five times the acceptable 12 seconds or 1% standard makes the case that IRMS data is unreliable. Crude retention times and retention time changes are in seconds. Percent differences of the relative retention times of the 995474 analyte and corresponding internal standard compared to the relative retention times of the 326579 analyte and corresponding internal standard.**

<sup>264</sup> For more on the significance of ISL and other violations, see page 16.

<sup>265</sup> WADA TD2003IDCR. 1. (2003). Identification criteria for qualitative assays incorporating chromatography and mass spectrometry. [http://www.wada-ama.org/rtecontent/document/criteria\\_1\\_2.pdf](http://www.wada-ama.org/rtecontent/document/criteria_1_2.pdf). Accessed Dec 28, 2006.

**\*\*\*6D. Bad Identification:  
Different Method Files  
GC/MS and GC/C-IRMS Files Differ  
Bad Technique = No Identification = Case Dispositive**

To use retention time/relative retention time to identify compounds in a separate GC/MS instrument and IRMS instrument, as LNDD did, it is critical that the conditions under which both GCs operate are the same. These conditions include a number of factors, including temperature and chromatography column. (The wrong use of chromatography columns is discussed on page 188.)

Temperature affects the rate at which compounds elute, or pass through the column. Generally, the higher the temperature, the less time a compound spends in the column. The procedure temperature is set in the GC method file. The method file is an electronic program that instructs the GC on its operation.

Therefore, in order to ensure proper identification in this case, the method files in the GC/MS and the GC/C-IRMS should have been identical. They were not.

The method files for the GC/MS and the GC/C-IRMS runs that tested Sample 995474 show dramatically different conditions.

For the GC/MS, the GC method file (M-AN-52<sup>266</sup>), as followed on USADA0303, shows the following:

- The column is conditioned at 70°C for one minute,
- The temperature is then ramped up to 270°C, increasing 30°C every minute; and
- The temperature is then ramped up to 300°C, increasing 10°C every minute.

This differs dramatically from the method file (M-AN-41) for the GC/C-IRMS. For the GC/C-IRMS, as documented on USADA0329, the GC method file is as follows:

- The column is conditioned at 70°C for one minute;
- The temperature is then ramped up to 271°C, increasing 30°C every minute;
- The temperature is then ramped up to 281°C, increasing 0.6°C every minute;
- The temperature is then held at 281°C for three minutes;
- The temperature is then ramped up to 300°C, increasing 5°C every minute; and
- It is then held at 300°C for 5 minutes.

These programs are similar until the temperature of each system reaches 270°C. After that, they differ dramatically.

The result of this difference is that the retention times and relative retention times of compounds are not comparable between the two systems. This failure precludes accurate compound identification.

The failure of LNDD to properly use its instruments has resulted in inaccurate and unreliable test results.

---

<sup>266</sup> LNDD SOP M-AN-52. Analyse GC/MS –Confirmation Qualitative des Métabolites de las Testostérone et de ses Précurseurs. LNDD0664.  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

### \*\*\*6E. Bad Identification:

#### Wrong Column Used

**Bad Technique = No Identification = Case Dispositive**

**ISL Violation<sup>267</sup>**

**ISO Violation**

**SOP Violation**

ISL 5.2.6.4:

Where instrumental analyses are conducted, the operating parameters for each run shall be recorded.

ISO 17025. 5.4.1:<sup>268</sup>

The laboratory shall have instructions on the use and operation of all relevant equipment, and on the handling and preparation of items for testing and/or calibration, or both, where the absence of such instructions could jeopardize the results of tests and/or calibrations.

All instructions, standards, manuals and reference data relevant to the work of the laboratory shall be kept up to date and shall be made readily available to personnel.

Deviation from test and calibration methods shall occur only if the deviation has been documented, technically justified, authorized, and accepted by the customer.

LNDD SOP M-AN-52.<sup>269</sup>

For the GC/MS portion of the IRMS analysis, the DB-17ms column should be used. (This is an operating SOP. It is *not* an identification SOP of the type referred to on page 180.)

<sup>267</sup> For more on the significance of ISL and other violations, see page 16.

<sup>268</sup> International Standard. ISO/EC 17025. 5.5.11, page 16. (2005).

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>269</sup> LNDD SOP M-AN-52. Analyse GC/MS –Confirmation Qualitative des Métabolites de las Testostérone et de ses Précurseurs. LNDD0664.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

### USADA0124. USADA0303.

The chromatography column used in the GC/MS portion of the IRMS analysis was Agilent part number 19091s-433. This is the HP-5ms column. (Read more about basic science and the role of chromatographic columns in analysis on page 329.)

Part Number	Description
19091S-433	HP-5MS, 0.25mm * 30m * 0.25um

Figure 121. Part number 19091s-433, as documented on USADA0124 and USADA0303, is the HP-5ms column, as documented at the Agilent website.<sup>270</sup>

### USADA0104. LNDD0664.

USADA0104 lists the SOPs associated with LNDD procedures.

For GC/C-IRMS, it documents SOP M-AN-52 as part of the GC/MS portion of the IRMS.

Anabolisants * LCMS	EC22A	I-CONF-22A	M-EX-03D	M-AN-47	HPLC/MS2 ESI
Anabolisants * LCMS	EC22B	I-CONF-22B	M-EX-03D	M-AN-47	HPLC/MS3 ESI
Analyse C12/C13 des métabolites de la testostérone	EC31	I-CONF-31	M-EX-24	M-AN-52	GC/MS (SCAN)
				M-AN-41	GC/C-IRMS
Antidope	EC-33A	I-CONF-33A	M-EX-02A	M-AN-46	HPLC/MS2 ESI

USADA 0104 91

Figure 122. USADA0104 documents the applicable SOPs that LNDD uses in IRMS analysis.

The method file SOP M-AN-52 is not found anywhere within the 370-page document package. It was also not produced in our requests for SOPs. However, in the Tour reprocessing, we found it in the reprocessing of sample 825424.

<sup>270</sup> [http://www.chem.agilent.com/eCommerce/product/Product\\_Catalog\\_3.aspx?prod\\_search=19091S-433&Pid=32486](http://www.chem.agilent.com/eCommerce/product/Product_Catalog_3.aspx?prod_search=19091S-433&Pid=32486). Accessed Oct 14, 2007.

LNDD	MODE OPÉRATOIRE	Codification : M-AN-52 Version : A Date : 28/10/2005 1/2
ANALYSE GC/MS - CONFIRMATION QUALITATIVE DES METABOLITES DE LA TESTOSTERONE ET DE SES PRECURSEURS		
<p style="text-align: center;"><b>COLONNE</b></p> <p>Type: DB17-MS JW Scien 122.4732</p> <p>Longueur: 30m</p> <p>Diamètre interne: 0.25mm</p> <p>Épaisseur du film: 0.25µm</p>		
LNDD 0664		

**Figure 123. LNDD0664. The applicable SOP, M-AN-52 requires the use of a DB-17ms chromatography column.**

LNDD0664 is stamped as applicable October 28, 2005. The retesting of sample 825424 was performed in 2007. This version of the SOP was therefore in force at the time of analysis of sample 995474 in July and August of 2006.

The SOP specifies that the chromatography column to be used for the GC/MS portion of the IRMS analysis is DB-17ms, discussed on page 87.

This is the same column specified in the ISO COFRAC accreditation for EC31, the IsoPrime.

This is not the column LNDD used in Landis.

**This is a clear violation of the LNDD's own standard operating procedure, and therefore the ISO.**

Arnie's comment:

The AAA majority were wrong in their opinion when they wrote: "The GC column is, of course, the same in both instruments."<sup>271</sup>

### ***Why The Same Columns Are Important***

As stated in *Compound Specific Isotope Analysis Requirements* above on page 178, the analysis is best carried out on a "hybrid" machine.

If the identification analysis is carried out with GC/MS on one machine and the quantification analysis with GC/C-RIMS on another machine (as it was in Landis), the chromatography columns used in GC/MS and GC/C-IRMS must be the same.

GC/MS analysis is necessary to absolutely identify the compounds.<sup>272</sup>

GC/C-IRMS analysis is necessary to:

1. Relatively identify the compounds absolutely identified in the GC/MS and
2. Quantify their isotopic ratios.

Without absolute identification, quantification is meaningless.

Different chromatographic columns not only change the absolute retention times, they change the relative retention times as well.

*Different columns can change the order of elutants.*

If the same columns are not used in GC/MS and GC/C-IRMS, absolute identification is impossible.

Again, without identification, quantification is meaningless.

<sup>271</sup> Majority award. 188. The opinions of the AAA panel are linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>272</sup> Absolute identification requires full GC/MS scans or three diagnostic ions. Relative identification requires retention times within the smaller of  $\pm 1\%$  or 0.2 minutes. WADA TD2003IDCR. 1. (2003). Identification criteria for qualitative assays incorporating chromatography and mass spectrometry. [http://www.wada-ama.org/rtecontent/document/criteria\\_1\\_2.pdf](http://www.wada-ama.org/rtecontent/document/criteria_1_2.pdf). Accessed Dec 28, 2006.

### *The Chromatography Columns Were Different*

Again, the columns used in the IRMS analysis were different.

#### **USADA0124. USADA0303.**

The column used in the GC/MS analysis was Agilent part number 19091S-433. This is an HP-5ms column.

Part Number	Description
19091S-433	HP-5MS, 0.25mm * 30m * 0.25um

Figure 124. Part number 19091S-433, as documented on USADA0124, is the HP-5ms column, as documented at the Agilent website.<sup>273</sup>

#### **USADA0153. USADA0329.**

The column used in the GC/C-IRMS analysis was an Agilent DB-17ms column.

### *The Columns Change the Order of Compounds*

The Agilent website includes a chromatogram library.

The library chromatograms show that the same substances *can* and *do* elute at different times and in different order on different columns—specifically, the columns used in Landis.

This is shown in Figure 125 and Figure 126.

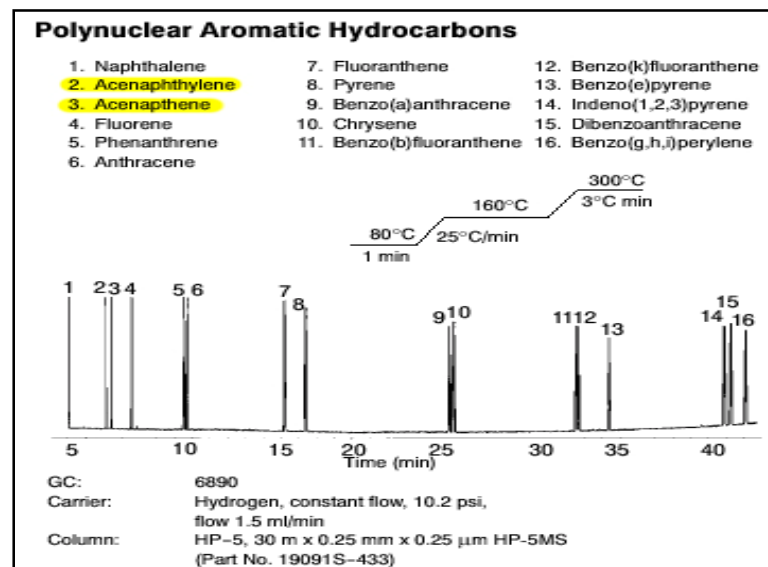


Figure 125. Agilent 19091S-433, as used in Landis GC/MS. PAH chromatogram from Agilent.<sup>274</sup> Yellow highlight: Acenaphthylene (2) elutes *before* acenaphthene (3).

<sup>273</sup> [http://www.chem.agilent.com/ecommerce/product/Product\\_Catalog\\_3.aspx?prod\\_search=19091S-433&Pid=32486](http://www.chem.agilent.com/ecommerce/product/Product_Catalog_3.aspx?prod_search=19091S-433&Pid=32486). Accessed Oct 14, 2007.

<sup>274</sup> <http://www.chem.agilent.com/temp/rad4AC04/00000123.JPG>. Accessed Oct 14, 2007.

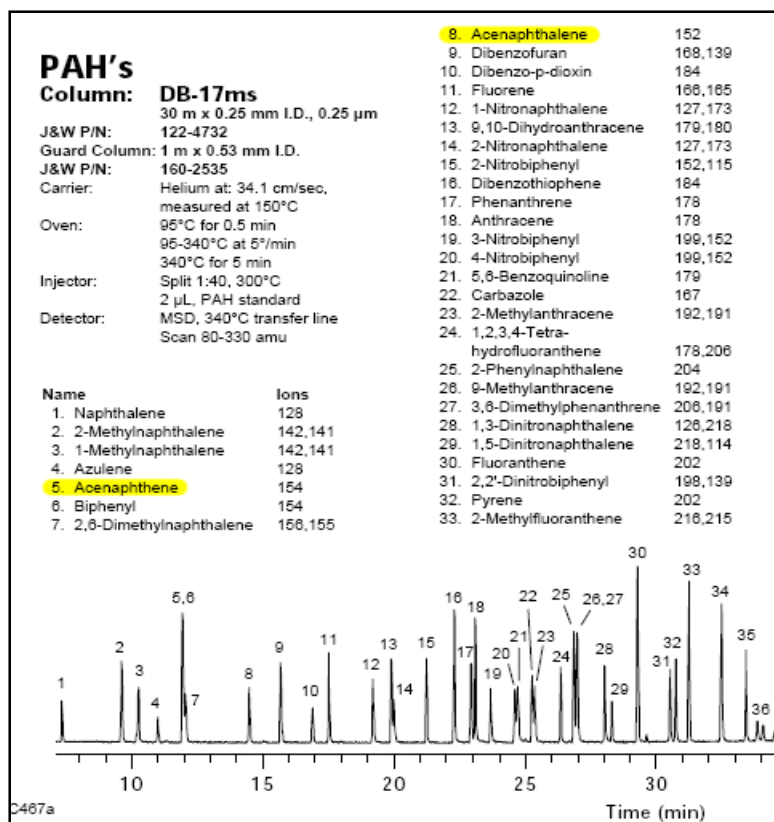


Figure 126. Agilent DB-17ms, as used in Landis GC/C-IRMS. PAH chromatogram from Agilent.<sup>275</sup> Yellow highlight: Acenaphthalene (8) elutes *after* acenaphthene (5). Note: Acenaphthalene, in this figure, is the same compound, a synonym, for the acenaphthylene used in Figure 125.<sup>276</sup>

Characteristics of the two columns used in the Landis IRMS are summarized in Table 23.

	HP-5ms <sup>277</sup>	DB-17ms <sup>278</sup>
(%-Phenyl)-methylpolysiloxane	5%	50% virtual
Polarity	Non-polar	Mid-polar
Acenaphthalene vs. acenaphthene	Elutes before	Elutes after

Table 23. When different columns are used, compounds may be retained and elute at different times and in different orders.

### More Examples of Columns Changing Elution Order

Here are further examples demonstrating that different columns result in different absolute and relative retentions times. The order of compounds on the chromatogram may change.

DB-5ms columns use a phenyl arylene polymer that is “virtually equivalent” to the (5%-Phenyl)-methylpolysiloxane polymer of the HP-5ms column used in the GC/MS portion of Landis’s IRMS analysis.<sup>279</sup> DB-17ms columns were used in the GC/C-IRMS portion of the IRMS analysis.

<sup>275</sup> <http://www.chem.agilent.com/temp/rad98357/00000522.PDF>. Accessed Oct 14, 2007.

<sup>276</sup> <http://environmentalchemistry.com/yogi/chemicals/cn/Acenaphthylene.html>. Accessed Oct 14, 2007.

<sup>277</sup> <http://www.chem.agilent.com/scripts/pds.asp?IPage=1336>. Accessed Oct 14, 2007.

<sup>278</sup> <http://www.chem.agilent.com/scripts/chromatograms.asp?sAndOr=1&gs=Key&gk=DB-17ms>. Accessed Oct 14, 2007.

<sup>279</sup> <http://www.chem.agilent.com/Scripts/PDS.asp?IPage=1128>. Accessed Oct 15, 2007.

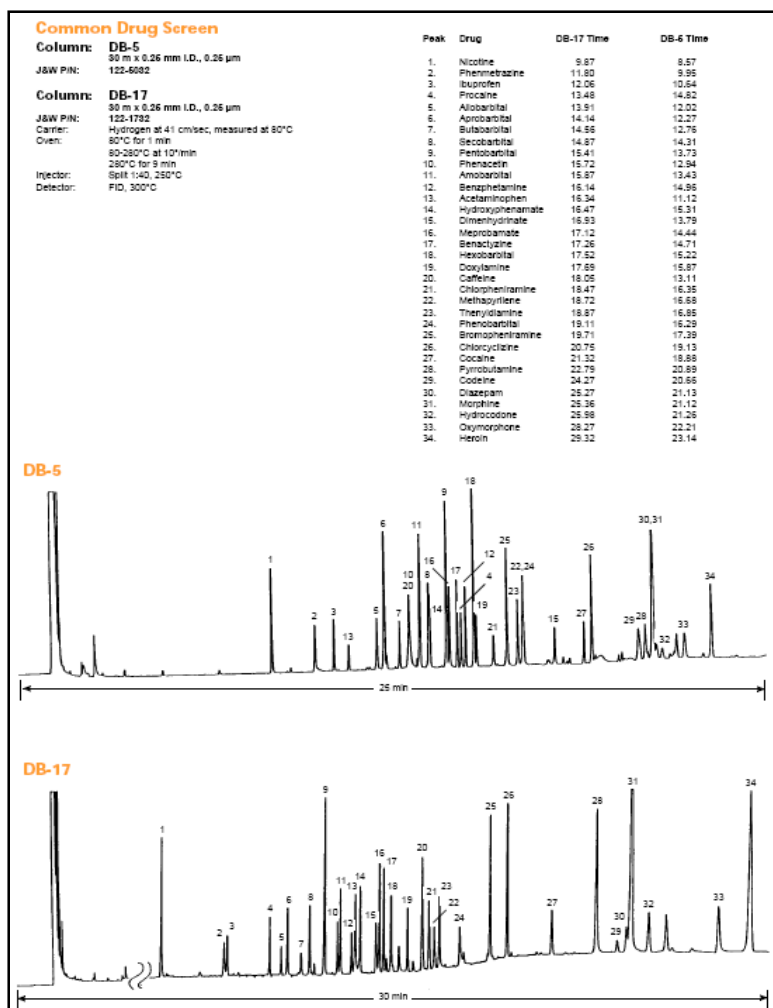


Figure 127. Drug screen on DB-5 (top) and DB-17 (bottom) columns. Different columns can and do change relative retention time and elution order. The order jumbles from 1→34 on the DB-17 column to 1-2-3-13-5-6-7-20-10-11-8-14-9-16-17-4-12-18-19-21-25-23-22-24-15-27-26-29-28-30-31-32-33-34 on the DB-5 column. Chromatograms from Agilent website.<sup>280</sup>

<sup>280</sup> <http://www.chem.agilent.com/temp/radC30C8/00000399.PDF>. Accessed Oct 15, 2007.

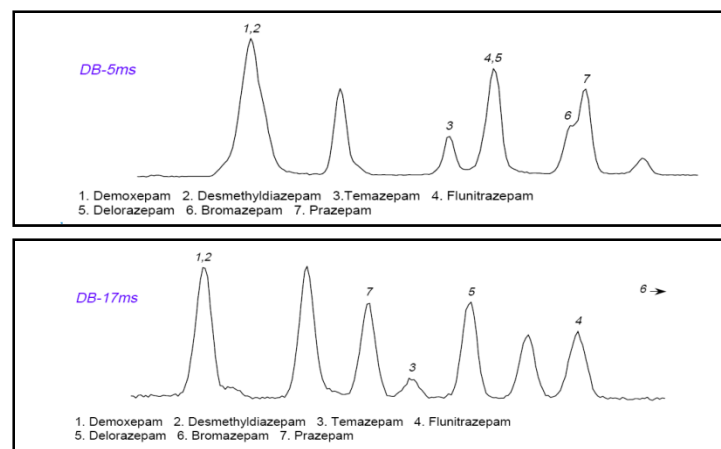


Figure 128. Benzodiazepines on DB-5ms (top) and DB-17ms (bottom) columns. Different columns can and do change relative retention time and elution order. The order changes from 1-2-3-4-5-6-7 to 1-2-7-3-5-4-6. Chromatograms from the Agilent website.<sup>281</sup>

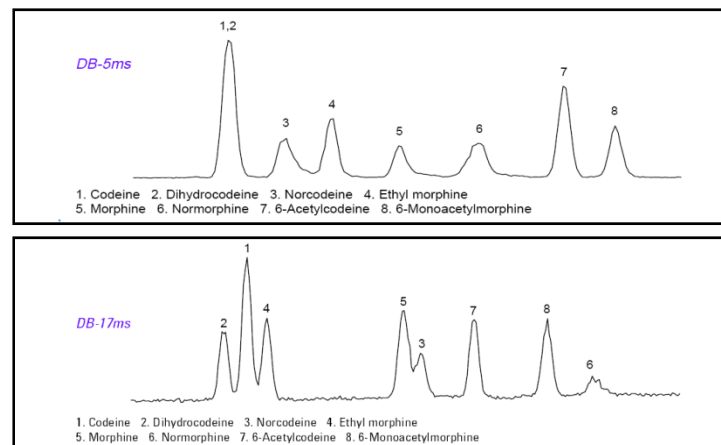
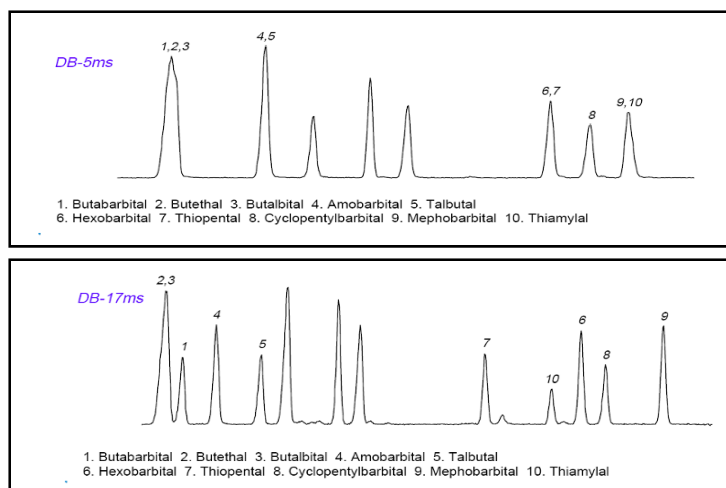


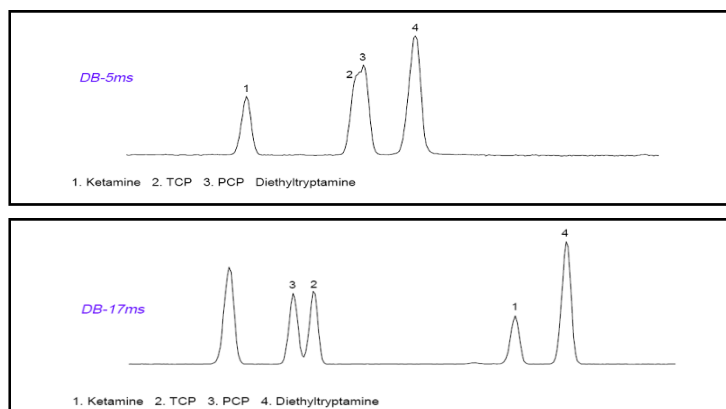
Figure 129. Opiates on DB-5ms (top) and DB-17ms (bottom) columns. Different columns can and do change relative retention time and elution order. The order changes from 1-2-3-4-5-6-7-8- to 2-1-4-5-3-7-8-6. Chromatograms from the Agilent website.

<sup>281</sup> <http://www.chem.agilent.com/temp/rad9EB55/00000013.PDF>. Accessed Oct 18, 2007.





**Figure 130. Barbiturates on DB-5ms (top) and DB-17ms (bottom) columns. Different columns can and do change relative retention time and elution order. The order changes from 1-2-3-4-5-6-7-8-9-10 to 2-3-1-4-5-7-10-6-8-9. Chromatograms from the Agilent website.<sup>282</sup>**

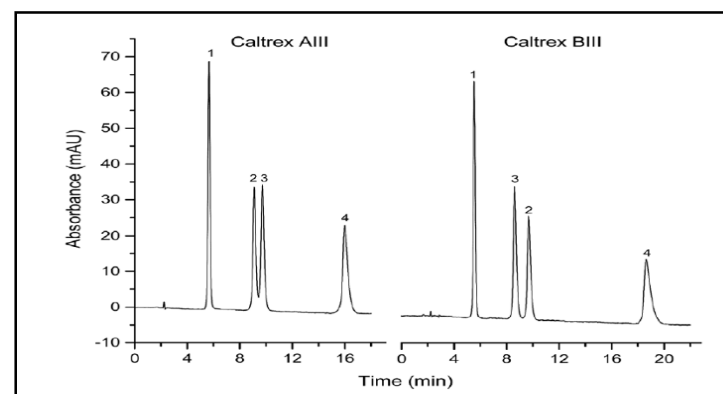


**Figure 131. Hallucinogens on DB-5ms (top) and DB-17ms (bottom) columns. Different columns can and do change relative retention time and elution order. The order changes from 1-2-3-4- to 3-2-1-4. Chromatograms from the Agilent website.**

<sup>282</sup> <http://www.chem.agilent.com/temp/rad9EB55/00000013.PDF>. Accessed Oct 18, 2007.

### **Columns Reverse Steroid Elution Order**

As shown in Figure 132, Skogsberg et al demonstrated that in a separation of four structurally similar steroids, two of the steroids had a reversed retention order when the columns were changed.<sup>283</sup>



**Figure 132. Different columns reverse elution order of steroid 2 and 3. Analytes: 1=norethisterone, 2=norethisterone acetate, 3=chlormadinone acetate, 4=testosterone acetate. Separation on Caltrex AIII and Caltrex BIII. From Skogsberg.**

<sup>283</sup> Skogsberg, U. et al. Investigation of the retention behaviour of steroids with calixarene-based stationary phases by modern NMR spectroscopy. *Journal of Separation Science*, vol. 26, p. 1119-1124. (2003).

## USADA Confirms Different Columns in Interrogatories

Before the AAA hearing, we checked with USADA about the columns. USADA wrote:<sup>284</sup>

“All GC column types, temperature programs and flow rate details have already been provided in the laboratory documentation packages, on the pages list in the table below.”

LNDD RESPONSE TO OCTOBER 16, 2006 “II. INTERROGATORIES”			
1. All GC column types, temperature programs and flow rate details have already been provided in the laboratory documentation packages, on the pages listed in the table below.			
	GC column	Temperature program	Flow rate
MSD T/E screen	Page USADA 0045		
MSD T/E confirmation A sample	Page USADA 0081	Page USADA 0080	Page USADA 0080-0081
MSD T/E confirmation B sample	Page USADA 0266	Page USADA 0265	Page USADA 0265-0266
MSD for GC/MS part of IRMS test A sample		Page USADA 0124	
MSD for GC/MS part of IRMS test B sample		Page USADA 0303	
GC/C-IRMS A sample	Page USADA 0153 “Pression constante: Ajuster le SI à environ 870s” means: <del>Constant pressure: Adjust IS at approximately 870 s.</del>		
GC/C-IRMS B sample	Page USADA 0329 “Pression constante: Ajuster le SI à environ 870s” means: Constant pressure: Adjust IS at approximately 870 s.		

Figure 133. USADA specifically refers us to the documentation package to affirm that different columns were used in the GC/MS and GC/C-IRMS portions of the carbon isotope test of the ‘A’ and ‘B’ samples (red boxes).

## Mongongu Confirms Different Columns at AAA Hearing

Not only did USADA tell us that the column used in the GC/MS portion of the IRMS test was different than the column used in the GC/C-IRMS portion, Mongongu confirmed it.

In testimony at the AAA hearing, Mongongu was specifically asked about the instrument control record pages (these included the documentation of column identification). Mongongu performed the ‘A’ sample and verified Frelat’s performance of the ‘B’ sample.

Mongongu confirmed that the entries on the instrument control record pages were correct and that she followed them. Mongongu also confirmed that the instrument control parameters Frelat used were as reported on the relevant ‘B’ sample pages.<sup>285</sup>

AAA Hearing Transcript Page 441

20 Q. Could you look at Page 0124.

21 A. 0124.

22 Q. Are you there?

23 A. Yes.

24 Q. Is that the procedure for the GC

25 method you followed?

AAA Hearing Transcript Page 442

1 A. Yes, that is the method of analysis.

2 Q. And you followed that in conducting

3 your work here.

4 A. Yes.

5 Q. And Mrs. Frelat followed it in doing

6 the B Sample?

7 A. Yes.

8 Q. And the standard operating procedure

9 you followed in performing the third step of the

10 IRMS analysis, what pages are those?

11 A. 0153.

12 Q. Page 153?

13 A. Yes.

14 Q. Okay. And that’s the procedure that

15 you followed for the IRMS analysis?

16 A. Yes.

<sup>284</sup> USADA’s Response to Respondent’s Second Request for Documents. Exhibit C. Page 1. February 7, 2007.

<sup>285</sup> The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

## USADA Posits Doc Pac Error for Columns Used

### *What Column Was Really Used? No Documentation*

The SOP clearly states, and the scientific literature supports the need for identical columns when GC/MS is used to identify and GC/C-IRMS is used to quantify analytes.

When we pointed this out, USADA produced an attestation from an outside-of-the-lab service engineer, Gerard LePetit, that he used an HP-5ms column in the GC/MS as part of his routine maintenance and service procedures (Exhibit T141), and must have taken the column with him to his next service call.

He also states that he probably reinstalled LNDD's column.

In his rebuttal declaration to CAS, USADA expert Brenna declared (page 8 at 19) that he ran analytes on both columns and that they eluted in the same order. (He makes no statement as to whether they eluted with the same retention times. Presumably, they did not.)

**Although USADA's documentation provides enough evidence for Brenna and their other experts, for example, Ayotte, to state that she is comfortable that the Agilent HP-5ms column *was not* used in the GC/MS analysis of 995474, there is no contemporaneous documentation as to what column was used.**

Although USADA documentation attests that the HP-5ms column part number 19091s-433 is *not used* in the laboratory, and therefore if Mr. LePetit took the column with him, it could not have been the Agilent HP-5ms column that was used, there are many other columns that the laboratory does use. Again, there *is no documentation* that the columns were, in fact, the same.

For example, according to LNDD's COFRAC accreditation 1-1174 (LNDD0074 to LNDD0100), in effect at the time, the laboratory routinely uses:

- HP1 (25m, 0.2mm-0.11um) for procedures EC08, EC09A, EC09A, EC09B, EC09C, EC09D, EC09F, EC10A, EC10B, EC11, EC11A, EC11B, EC12A, EC12B, EC13A, EC13B, EC13C, EC14A, EC14B, EC18A, EC18B, EC23C, EC23D, EC24B, EC24C, EC25, EC26, EC27A, EC27B, EC40, ES01B,

ES02, and ES04.

There is no satisfactory documentation that this column was not used.

- Zorbax RX-C8 for procedures EC28A, EC28B, EC32A, EC32B, and ES03.

There is no satisfactory documentation that this column was not used.

- DB17MS for procedure EC31.

There is no satisfactory documentation that this column was not used.

- EclipseXDB-8 for procedure EC22.

There is no satisfactory documentation that this column was not used.

- HP-5MS (30m-0.2mm-0.11um) for procedure ES01A.

This column is of the same type as recorded in the document package as having been used, though of different dimensions.

There is no satisfactory documentation that this column was not used.

### *Documentation Faulty*

The MDS maintenance log (Ex. 142) is a partial log of maintenance on the instrument used to conduct the GC/MS portion of Landis's IRMS test. The log entries are sequentially numbered from 5 through 10.

It purports to document the visit of the outside service engineer from April 24 to April 26, 2006, and the changing of the column by the laboratory personnel on April 27, 2006.

There are several significant problems with this log.

1. The date of log entry 5 is January 31, 2006. The date of log entry 6 is January 20, 2006.

Since out of sequence contemporaneous records are impossible, this does not make sense.

2. The log records that operator 26, Frelat, changed the column. Mongongu makes a declaration about the column change.

Mongongu states that she is “certain that the column installed in April 2006” was a DB-17ms column.

Since Frelat, not Mongongu, made the change, why did Frelat not make the declaration? Frelat’s declaration is silent on this point. If Mongongu was not the person responsible, how does she know?

### **Chromatography Column Summary**

The same columns must be used in GC/MS identification and GC/C-IRMS quantification.

If the same columns are not used, absolute identification is impossible; and without accurate identification, quantification is meaningless.

According to its documentation, the LNDD used different chromatographic columns for the GC/MS and GC/C-IRMS analysis.

In so doing, LNDD violated the ISO accreditation and its own SOP.

If the columns were, in fact, the same, the LNDD violated to ISL for documentation.

In either case, the LNDD analysis cannot be accepted.

### \*\*\*6F. Bad Identification: Bad Chromatography Bad Technique Case Dispositive

#### ISL Violation<sup>286</sup>

##### ISL 5.2.6.1:<sup>287</sup>

“The Laboratory must have documented procedures to ensure that it maintains a coordinated record related to each Sample analyzed. In the case of an Adverse Analytical Finding, the record must include the data necessary to support the conclusions reported (as set forth in the Technical Document, Laboratory Documentation Packages). In general, the record should be such that in the absence of the analyst, another competent analyst could evaluate what tests had been performed and interpret the data.”

##### ISL 5.4.4.2.1:<sup>288</sup>

“Matrix interferences. The method should avoid interference in the detection of Prohibited Substances or their Metabolites or Markers by components of the sample matrix.”

As discussed throughout this book, good chromatography is essential for accurate analysis.

Good chromatography includes well-separated peaks, a lack of matrix inference, and level baselines.

Landis’s occasional abnormal delta values occur in the muck and mire of bad LNDD chromatography.

For background information about GC/MS and GC/C-IRMS chromatography, see *Appendix G: Test Procedures and Problems* on page 313.

“Reliable isotope ratio results are obtained when GC/C-IRMS peaks are strong and cleanly resolved from other peaks.”

“Precision is no assurance of accuracy, particularly in continuous-flow IRMS.”<sup>289</sup>

“Problems are encountered when peaks are close together or slightly overlapping, are of small signal, or appear on curved baselines.”<sup>290</sup>

The author, Brenna, in a figure, then shows that such problems can result in errors of more than 6.0‰. Keep in mind that only one of four Landis’s metabolites was beyond the range of the LNDD’s measurement uncertainty. That metabolite was out of range by 2.59‰, less than half of Brenna’s demonstrated 6.0‰ error.

The bottom line point emphasized at USADA’s 2<sup>nd</sup> Annual Symposium on IRMS:<sup>291</sup>

***“Well separated peaks with good symmetry are important to analysis.”***

<sup>286</sup> For more on the significance of ISL and other violations, see page 16.

<sup>287</sup> WADA International Standard for Laboratories. 5.2.6.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>288</sup> WADA International Standard for Laboratories. 5.4.4.2.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>289</sup> Brenna, T. Effects of Chromatographic Overlap on Uncertainty. 2<sup>nd</sup> Annual USADA Symposium on Anti-Doping Science. Application of Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry to Doping Control. Los Angeles. Page 77. (2003). USADA0882. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>290</sup> Brenna, T. Effects of Chromatographic Overlap on Uncertainty. 2<sup>nd</sup> Annual USADA Symposium on Anti-Doping Science. Application of Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry to Doping Control. Los Angeles. Page 76. (2003). USADA0882. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>291</sup> Uncertainty in GC/C-IRMS Measurement as Applied to Doping Control. 2<sup>nd</sup> Annual USADA Symposium on Anti-Doping Science. Application of Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry to Doping Control. Los Angeles. Page 87. (2003). USADA0882. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

### Good Analysis: The Calibration Mix

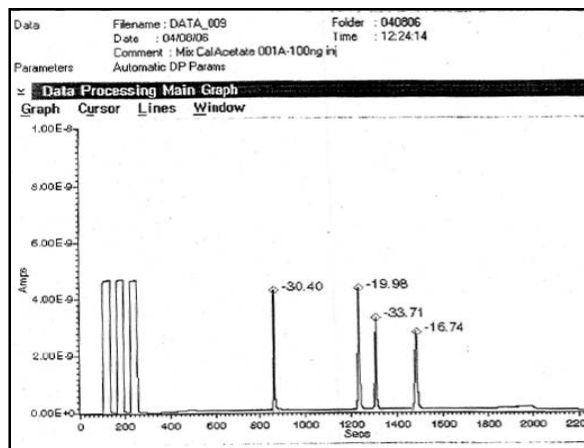


Figure 134. USADA0361. IRMS chromatogram of acetate calibration mix. Constant baseline. Well-resolved peaks. This is how all chromatograms should appear.

### Marginal Analysis: The Blu (Control Negative)

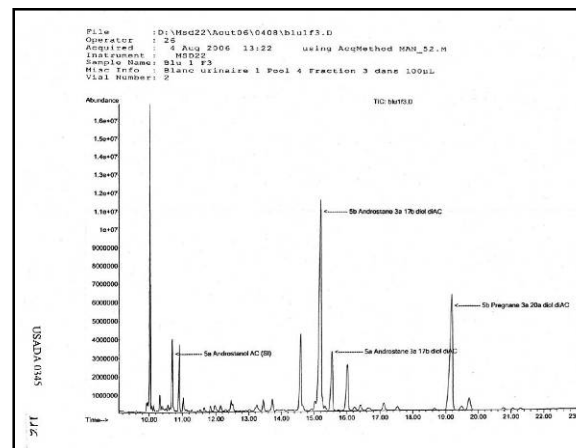


Figure 135. USADA0345. CG-MS chromatogram of Blu (control negative) diol fraction. Constant baseline.

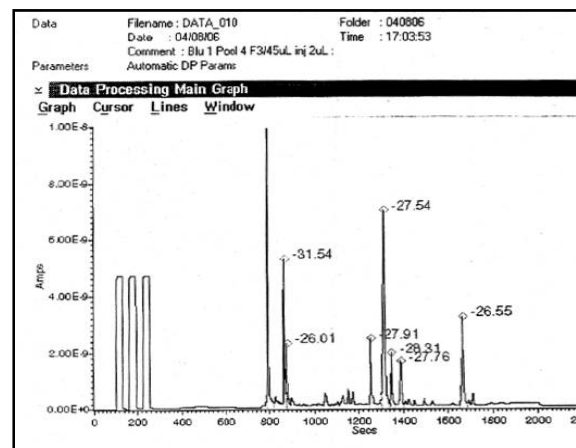


Figure 136. USADA0346. IRMS chromatogram of Blu (control negative) diol fraction. Constant baseline. Peak/baseline resolution problems. IRMS inaccuracy possible.

## Failed Analysis: 995474: Landis Stage 17

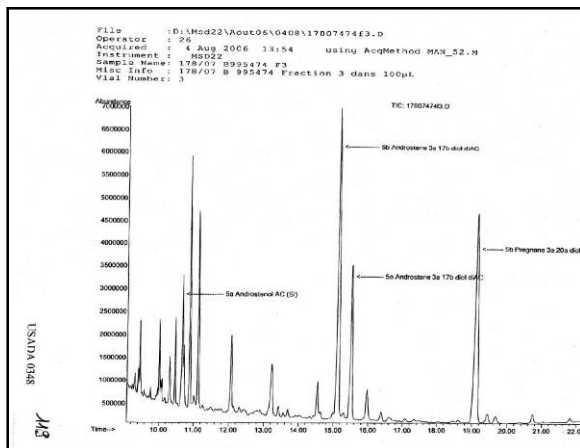


Figure 137. USADA0348. CG-MS chromatogram of Landis's Stage 17 diol fraction. High, down-sloping baseline. Peak/baseline resolution problems.

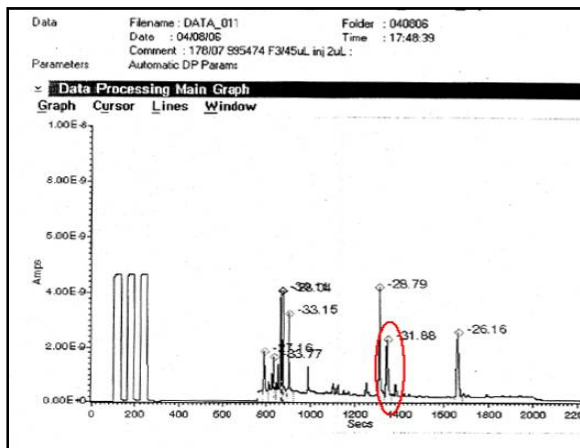


Figure 138. USADA0349. IRMS chromatogram of Landis's Stage 17 diol fraction. High, down-sloping baseline. Baseline resolution problems. There is a right shoulder on the supposed 5-alpha androstane diol peak. IRMS inaccuracy likely.

## Mongongu Testifies to Matrix Interference

### SOP Violation: Documentation Package Inadequate to Analyze

AAA Hearing Transcript Page 618

17 Q. Can you look at this peak and tell  
18 me whether or not you see matrix interference  
19 there?

20 A. To see if I have any matrix  
21 interference, it's difficult to look at this  
22 chromatogram. I would have to see the 45, 44  
23 report.

24 MR. BRUNET: Is it a report or a  
25 ratio?

AAA Hearing Transcript Page 619

1 THE INTERPRETER: Or ratio. I'm  
2 sorry.

3 A. It's ratio.  
4 MR. BRUNET: In French, it's the  
5 same word.

6 THE INTERPRETER: Thank you.  
7 Q. All right. So your testimony is  
8 that in order to know whether or not this has a  
9 peak -- this peak of interest has matrix  
10 interference, we would have to have the Mass 44,  
11 Mass 45 graph, correct?

12 A. I can't answer yes. I can't -- yes,  
13 I cannot give you an answer by looking at this  
14 chromatogram there.

15 Q. Because she needs what?  
16 A. I need to look at the correspondence  
17 of the traceability 45, 44 -- of the ratio.

18 THE INTERPRETER: I'm sorry.

19 A. I need to look at the ratio, 45, 44.

20 Mr. Suh: Mr. Chair, I would like to  
21 point out for the record, that the very document  
22 that the witness has just said that she would  
23 need to have in order to determine whether or  
24 not there's matrix interference here, which is,  
25 of course, what we would need to establish

AAA Hearing Transcript Page 620

1 matrix interference to the rest of the  
2 chromatogram further on down, we never received.  
3 We don't have those documents, and we asked for  
4 them.

5 So, because we didn't get those  
6 documents, we're going to stop the cross right  
7 now with the right to recall this witness.



8 MR. BARNETT: And we will point out  
9 for the record that, as the Panel well knows,  
10 the discovery discussions in this case were  
11 quite lengthy and ended with Respondent agreeing  
12 that they had everything they had with the  
13 Panel's orders and that they needed the  
14 electronic deals, which were reprocessed, which  
15 we heard about, and we all know the results of  
16 those.  
17 MR. SUH: Just for clarity sake, we  
18 have never, ever said we have had everything we  
19 needed to have. Never. And --  
20 MR. BRUNET: Mr. Suh --  
21 MR. SUH: -- we have proof of it  
22 today because that's what the witness just told  
23 us. It's not what we said. The witness just  
24 told us, to accurately quantify this, the  
25 witness told us, we need additional documents,

AAA Hearing Transcript Page 621  
1 which we never got. And we never, ever said we  
2 got everything.

## Bad Technique Summary

Well-separated peaks were not achieved.

Co-elution, evidenced by shoulders, is present

Baseline separation was not achieved.

The documentation package was inadequate.

Accuracy in analysis of Landis's Stage 17 sample 995474 is unlikely.

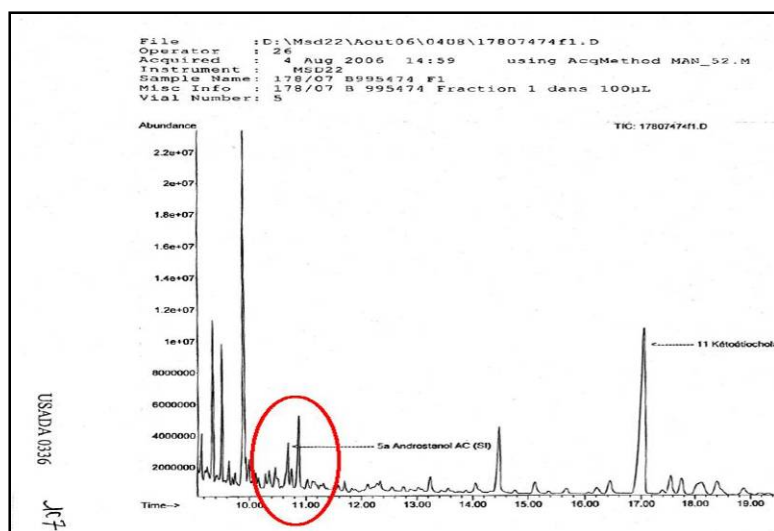
	Calibration Mix	Blu (Negative Control)	995474 (Landis)
Baseline	Good	Good	Bad
Peak Resolution	Good	Marginal	Bad
Shoulders	None	None	Yes
IRMS Accuracy	Good	Marginal	Lab Failure

**Table 24. Summary of failures of technique in IRMS analysis of sample 995474 (Stage 17 Landis).**

### \*\*\*6G. Bad Identification: Internal Standard Failure Lack of Precision is Case Dispositive

The internal reference standard is the anchor for identifying peaks in GC/MS and IRMS analysis.

Since other peaks confound identification in the region of the internal standard, the laboratory must use a combination of retention time and delta value in IRMS analysis or it has *no* method to identify the internal reference standard.



**Figure 139. LNDD0336. If retention time and delta value are not used to identify the internal reference standard, how can the SI be identified in this chromatogram?**

USADA<sup>292</sup> and USADA expert Brenna originally stated that the LNDD used the internal standard for both its retention time and isotopic value.

<sup>292</sup> USADA's Response to Respondent's Second Request for Documents. Page 7. February 7, 2007.

“Instrument performance in connection with the analysis of Sample #995474 was verified by the use of a known internal standard each time Sample #995474 was analyzed, and known positive and negative controls each time Sample #995474 was analyzed. (One can determine that the assay and instrument were performing properly when the instrument provides data on the internal standards and positive and negative controls within the range that is acceptable, for example for signal strength or measured value.).”

In questioning by Landis attorney Suh, Brenna painstakingly and reluctantly admitted that this quality control measure was outside its acceptable range. He then changed his story. Here is Brenna’s AAA admission that the internal standard has failed as a quality control.<sup>293</sup>

AAA Hearing Transcript Page 308

13 Q. Yes, the 5-alpha-androstanol AC,  
14 which is being used to measure quality control  
15 in order to determine --  
18 -- in order to determine whether or  
19 not the instrument is operating accurately in  
20 the sample?  
21 A. I see minus 31.64. I believe that’s  
22 the point that you’re referring to?  
23 Q. Right.  
24 A. So, the sample site.  
25 Q. Right.

AAA Hearing Transcript Page 309

1 And is the minus 31.64 within the  
2 range that the instrument was supposed to --  
3 LNDD was supposed to identify as within range?  
4 A. Well, I didn’t make a mental note of  
5 the range.  
6 Q. Here, let me show it to you.  
7 Okay. I’ll put it right up here.  
8 Apparently, if you touch the screen,  
9 you can make a red line. You apparently can’t  
10 take it off either; at least I can’t.  
11 Look at this.  
12 A. So it’s outside.  
13 Q. It’s outside?  
14 A. It seems to be outside, yeah.  
15 Q. Okay. So that’s one instance in

16 which the instrument failed to properly quantify  
17 the internal standard, correct?  
18 A. I think it is correct, yes.  
19 Q. You think it is, or it is?  
20 A. It’s correct. It’s outside the  
21 range.  
22 Q. All right. Thank you.

The laboratory analysts state that the laboratory does not use the delta value of the internal reference standard in sample analysis. They state that they use it only for relative retention times.

For more on false statements and the waffling of USADA and by Brenna regarding this issue, see page 70 and page 379.

**Wolfram Meier-Augenstein’s comment:**

**If the laboratory does not use delta values in its reference standard for sample analysis, how on earth can they identify the internal standard in, for example, the F1 fraction of the ‘B’ sample analysis shown in Figure 139?**

The lab’s own guidelines state that the uncertainty of single metabolite measurement is required to be less than 0.5‰ delta units.

(Measurement error and measurement uncertainty are also discussed in more detail beginning on page 231.)

LNDD’s internal reference standard for IRMS testing is 5-alpha-androstanol AC. Its mean value is -30.46‰ delta units. Its acceptable range is: -29.96‰ to -30.96‰ delta units.

The LNDD appears to be able to quantify this substance within a delta-unit accuracy of 0.5‰ in the most trivial of tests, a calibration mix.

***Considering its inability to process urine adequately for accurate chromatography, as discussed on page 197, it is not surprising, and it is evident, that the laboratory is unable to consistently quantify its own reference standard in urine.***

<sup>293</sup> The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

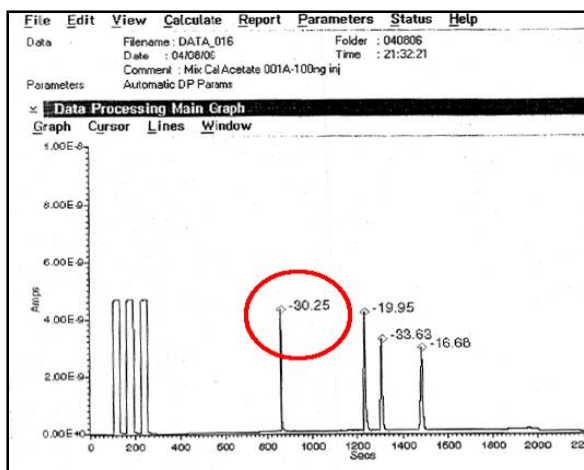


Figure 140. USADA0363. Measuring a reference standard in a calibration mix is a relatively trivial task.

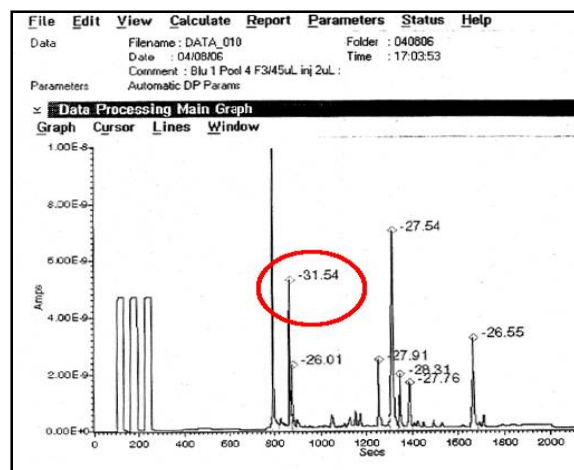


Figure 142. USADA0346. LNDD cannot accurately measure its own internal reference standard in Blu (control negative) urine. 'B' sample F3 fraction. The value -31.54 falls outside the acceptable -29.96 to -30.96 range.

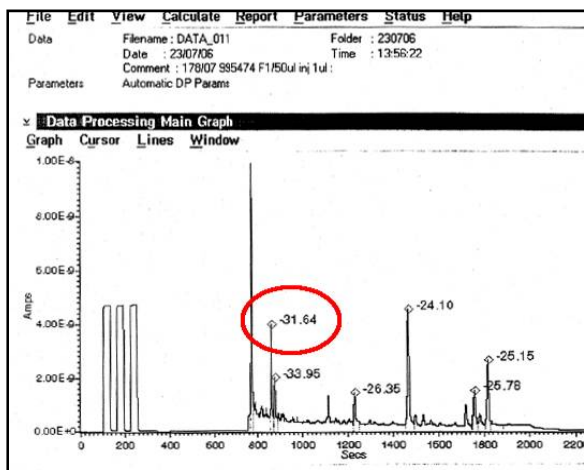


Figure 141. USADA0161. LNDD cannot accurately measure its own internal reference standard in Landis's urine. 'A' sample F1 fraction. The value -31.64 falls outside the acceptable -29.96 to -30.96 range.

### *LNDD Cannot Even Control IS Retention Time Accurately*

Even if one accepts that the only purpose of the interval standard is to anchor retention time at 870 seconds, the laboratory is historically unable to meet its standard more than 15% of the time.

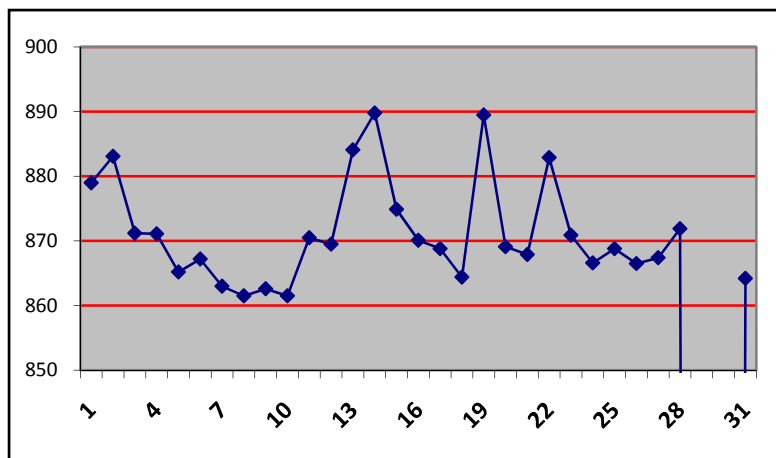
Here is Frelat's testimony at the CAS hearing about its retention time standard:<sup>294</sup>

CAS Hearing Transcript

Page 863

1 CLAUDE FRELAT - DIRECT  
2 pressure. So that that time should be  
3 approximately 870 seconds.  
4 Q. And how close to 870 seconds  
5 is the 5-alpha AC set at?  
6 A. We set the AC as close as  
7 possible to the value SI. We set the  
8 internal standard as close as possible  
9 to the value. The time can be from 860  
10 seconds to 880.

<sup>294</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.



**Figure 143. Retention times of the internal standard “5-alpha-AC” at LNDD in fraction 3 of positive GC/C-IRMS analyses 2004 to 2006. USADA exhibit T110. The laboratory fails more than 15% of the time to measure the internal standard within specified retention time parameters. Two of the last three values are undetermined.**

The values of the 25 Isoprime1 positives from 2004 through 2006 are also instructive because:

1. On one occasion, the internal standard isotopic ratio was measured at -47.49. (The acceptable range is -29.96 to -30.96. This is off by more than 16 delta units, on a known control standard. Consider that an athlete is considered positive if only one metabolite value is off by just 3.0 delta units.)
2. On two occasions, two peaks near the 870 mandated retention time made identification of the internal standard peak impossible.

Date	Sample No	IS Delta Value	IS RT	Bates
22.06.2004	303955A	-30.48	879.0	LNDD1658
21.07.2004	290274A	-30.20	<b>883.1</b>	LNDD1665
28.09.2004	290151A	-30.36	871.2	LNDD1671
11.02.2005	310844A	-29.69	871.1	LNDD1678
01.03.2005	312945A	-28.55	865.2	LNDD1685
02.03.2005	312947A	-28.78	867.2	LNDD1692
05.04.2005	312964A (1)	-30.06	863.0	LNDD1699
05.04.2005	312964A (2)	-30.83	861.5	LNDD1701
13.04.2005	311053A	-29.41	862.6	LNDD1708
18.04.2005	314748A	-30.28	861.5	LNDD1715
09.06.2005	315832 (1)	-30.76	870.5	LNDD1722
09.06.2005	315832 (2)	-29.78	869.5	LNDD1724
12.07.2005	315089	-30.38	<b>884.1</b>	LNDD1731
18.07.2005	874104	-30.33	<b>889.8</b>	LNDD1738
20.09.2005	323653	-30.52	874.9	LNDD1745
10.11.2005	825675A (1)	-31.15	870.1	LNDD1762
10.11.2005	825675A (2)	-30.91	868.8	LNDD1764
16.11.2005	873749A	-30.84	864.4	LNDD1770
18.12.2005	294415A	-30.65	<b>889.5</b>	LNDD1777
21.02.2006	326579 (1)	-30.52	869.1	LNDD1786
21.02.2006	326579 (2)	-30.46	867.9	LNDD1784
17.02.2006	875608	-30.99	<b>882.9</b>	LNDD1794
21.07.2006	335598 (1)	<i>-47.49</i>	870.9	LNDD1808
21.07.2006	335598 (2)	-30.07	866.6	LNDD1810
20.07.2006	336456	-30.46	868.8	LNDD1817
29.08.2006	338000	-30.03	866.5	LNDD1824
23.07.2006	995474 A	-30.05	867.4	LNDD1830
04.08.2006	995474 B	-30.11	871.9	USADA0350
28.08.2006	396666	-30.30 or 31.14	866.4 or 874.4	LNDD1838
21.09.2006	397312	-30.84 or 31.41	860.1 or 872.1	LNDD1845
13.09.2006	873492	-30.35	864.2	LNDD1852

**Table 25. Historical 5-alpha androstanol AC internal standard retention times and isotopic values in the F3 fraction of 25 positive samples from 2004 to 2006 performed on the Isoprime1 machine. Five samples required repeat analysis. Bolded values are out of the accepted internal standard retention time range (ISRT). The *-47.49* delta value (italicized) shows just how wrong the lab can be.**

## Bad Internal Standard Accuracy Summary

If the laboratory cannot accurately measure its own, known, internal reference standard, how can it measure an unknown substance?

	Calibration Mix	Blu (Negative Control)	995474 (Landis)
Acceptable Range	-29.96 to -30.96		
'A' Sample Failure	-30.29		-31.64 (USADA0161)
'B' Sample Failure	-30.25	-31.54 (USADA0346)	
In Range?	Yes	<b>No</b>	<b>No</b>
Pass/Failure	Pass	<b>Lab Failure</b>	<b>Lab Failure</b>

**Table 26. Summary of accuracy in measuring values of 5-alpha androstanol AC reference standard in 'A' and 'B' samples.**

**\*\*\*6H. Bad Identification: Results Not Reproducible  
Reprocessing Outside of Stated Accuracy Range  
Software and Operator Failure. Disclosure Failure<sup>295</sup>  
Case Dispositive**

**ISL Violation<sup>296</sup>  
ISO Violation**

ISL 5.2.6.1:<sup>297</sup>

“The Laboratory must have documented procedures to ensure that it maintains a coordinated record related to each Sample analyzed. In the case of an Adverse Analytical Finding, the record must include the data necessary to support the conclusions reported (as set forth in the Technical Document, Laboratory Documentation Packages). In general, the record should be such that in the absence of the analyst, another competent analyst could evaluate what tests had been performed and interpret the data.”

ISO 17025. 5.5.11:<sup>298</sup>

“Where calibrations give rise to a set of correction factors, the laboratory shall have procedures to ensure that copies (e.g. in computer software) are correctly updated.”

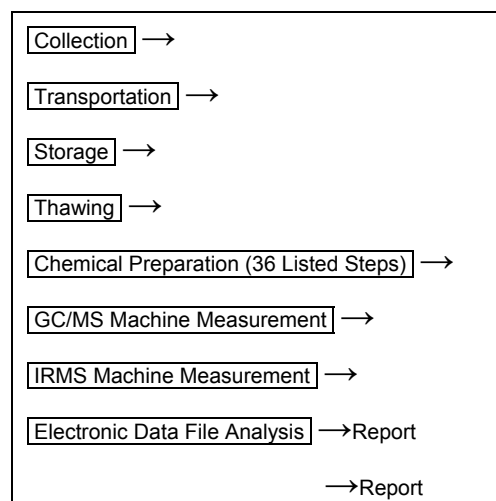
***The Accuracy Budget***

Isotope ratio mass spectrometry results are reported for four subtraction values.

The “measurement error” of “measurement uncertainty” of the IRMS subtraction values can be based on adding known or estimated sources of inaccuracy in analysis.<sup>299</sup>

The laboratory asserts a measurement uncertainty of 0.8 delta units for these subtraction values. This means that the sum total of *all* errors in *all* steps in its analysis is less than 0.8 delta units. See Figure 144.

For more information about measurement error, see page 231.



**Figure 144. The analysis chain. Inaccuracies at any point along the chain can result in erroneous results. In the final link, the electronic data file analysis link, the lab's inaccuracy exceeds 200% of overall stated accuracy budget.**

<sup>295</sup> See also page 122.

<sup>296</sup> For more on the significance of ISL and other violations, see page 16.

<sup>297</sup> WADA International Standard for Laboratories. 5.2.6.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>298</sup> International Standard. ISO/EC 17025. 5.5.11, page 16. (2005).  
Linked at: <http://arniebakerrecycling.com/books/wiki.htm>.

<sup>299</sup> Spirito, E, et al. The role of measurement uncertainty in doping analysis. Int. J Risk Assessment and Management. 5 (2/3/4), 378. (2005).  
[http://inderscience.metapress.com/\(ecjzvf450gwgboutto2y0c2f\)/app/home/contribution.asp?referrer=parent&backto=issue,16,17;journal,3,12;linkingpublicationresults,1:110887,1](http://inderscience.metapress.com/(ecjzvf450gwgboutto2y0c2f)/app/home/contribution.asp?referrer=parent&backto=issue,16,17;journal,3,12;linkingpublicationresults,1:110887,1). Accessed Dec 28, 2006.



### ***Reprocessing the Electronic Data Files***

Due to a question about the suitability of decades-old OS2 software, the AAA Panel ordered the reprocessing of the original electronic data files on more modern software. (See page 118.)

However, the files had been previously removed from the Isoprime1 machine and stored on floppy discs. They could not be authenticated through a satisfactory chain of custody.

Dr. Botrè, the arbitration-panel appointed expert, devised a test: He supervised the rerunning of allegedly original electronic data files on the original machine, with the original software, by the same operator who first analyzed them. This reprocessing took place on May 4 and May 5, 2007.

The operators performed manual peak starts and peak stops. The operators performed manual baseline corrections.

***At the AAA and CAS hearings, the operators confirmed that they performed manual integration on almost every peak in standards, controls, and samples.***

That could be okay, although sophisticated computer algorithms should perform better than the rougher visual inspection of technicians.

When originally processed, the operators should have stored and saved all of the original data, including peak start and stop points, and baseline selection.

The values using these manually selected parameters on processing should be available to the operators on reprocessing. Reprocessing should then generate identical results to the original.

***However, the operators did not document their original work.***

***As Table 27 shows, the results for the ‘B’ sample were not only inexact, but in three out of four subtraction ratios the values did not fall within the laboratory’s total accuracy budget.***

***As Table 29 shows, despite more than 100 attempts at manual manipulation of the ‘B’ sample, and more than 30 attempts at manually reprocessing the ‘B’ sample, the original results were not reproducible.***

<b>B Sample Metabolite-ERC</b>	<b>Original Result August 4, 2006.</b>	<b>Electronic File Rerun May 5, 2007 Original machine software Same operator.</b>	<b>Difference</b>	<b>Percent Accuracy Budget</b>	<b>Accuracy Budget Pass/Fail?</b>
<b>Etio – 11K</b>	-2.02	-0.35	1.67	>200%	<b>Lab Fails</b>
<b>Andro – 11K-Eito</b>	-3.51	-1.61	1.90	>235%	<b>Lab Fails</b>
<b>5β-Adiol – 5β-Pdiol</b>	-2.65	-3.05	0.40	50%	
<b>5α-Adiol – 5β-Pdiol</b>	-6.39	-7.19	0.80	100%	<b>Lab Fails</b>

**Table 27. ‘B’ sample reprocessing. Results follow a chain of procedures. In the final link of the chain alone, the lab’s error is greater than its overall error budget.**

Moreover, the laboratory has a Standard Operating Procedure (SOP), (M-DP-31, LNDD0603 to LNDD0609) for manual correction of peak starts and stops, as well as background subtraction.

SOPs should be developed and written so that the same or different operator can achieve the same results.

The operators attempted a total of 150 manual manipulations to the data in an effort to reproduce the original results.

They were unsuccessful.

In the 'B' sample, despite more than 100 manual manipulations, three out of four of the values are 0.8 or more delta units different than were originally verified as accurate results.

The etiocholanolone subtraction value is 1.67 delta units different.

The androsterone subtraction value is 1.90 delta units different.

The 5-alpha androstanediol subtraction value is 0.8 units different.

***For two out of the four metabolites, this represents more than 200% of the lab's own stated total accuracy budget in just this one, final link in a long chain of errors.***

#### ***Multiple Attempts at Reprocessing 'A' Sample***

		New Background Point Added	Background Point Changed	Peak Start / Stop Changed	Sample Reprocessed
<b>A</b>	<b>Mongongu</b>				
	995474 F3	3	1	2	3
	Blu 1 Pool 4 F1	2	3	1	1
	995474 F1	7	5	2	5
	Blu 1 Pool 4 F2	3	1	1	3
	995474 F2	2	1	2	2
	Mix Cal Acetate	5		2	1
	<b>Manipulations/Reprocessing</b>	22	11	10	15

**Table 28. Mongongu made more than 40 manual manipulations of the 'A' sample. She manually reprocessed the sample 15 times. The reprocessed data did not match the original.**

**Arnie's comment:**

Watching the reprocessing allowed our observers to gain insight into the utter incompetence of the laboratory's methods and operators.

The laboratory could not reproduce its original results—even with its own machine, software, and personnel—within its own stated accuracy rates.

The data are completely unreliable.

### Multiple Attempts at Reprocessing 'B' Sample

		New Background Point Added	Background Point Changed	Peak Start / Stop Changed	Sample Reprocessed
<b>B</b>	<b>Frelat</b>				
	Mix Cal Acetate	5	4	2	4
	Blu 1 Pool 4 F3. Attempt #1	5			6
	Blu 1 Pool 4 F3. Attempt #2	10	9		4
	Blu 1 Pool 4 F3. Attempt #3	4	8	4	2
	995474 F3	7	9	1	2
	Reprocessing re-started	3	4	2	3
	Blu 1 Pool 4 F1	3	2	1	2
	995474 F1	3	4	1	4
	Blu 1 Pool 4 F2	2	2	2	3
	995474 F2	4	4	0	1
	Mix Cal Acetate	2	3	3	1
	<b>Manipulations/Reprocessing</b>	<b>48</b>	<b>45</b>	<b>14</b>	<b>32</b>

**Table 29. Frelat made more than 100 manual manipulations of the 'B' sample. She manually reprocessed the sample 32 times. The reprocessed data did not match the original. Not only that, despite this extraordinary labor-intensive effort, for three out of four metabolites, the reprocessed data did not fall within the laboratory's total measurement uncertainty.**

Arnie's comment:

Was it A Set-Up?

The laboratory knew Landis was going to get the electronic data files (EDFs) of the 'B' sample.

The laboratory knew that Landis's experts were planning to run the EDFs on more modern software (for example, MassLynx).

There was a question as to whether or not the files we received from the laboratory were authentic.

This question arose because the panel's own expert, Dr. Botrè, was not present for the retrieval of the EDFs from the hard drive.

Instead, what Botrè received was a copy of a copy of a copy of the EDFs from the hard drive.

Botrè, on a teleconference, devised a plan to authenticate the EDFs.

He would reprocess the files on the original machine with the original software before running the files on MassLynx.

The laboratory asserts a delta/delta measurement uncertainty of 0.8 delta units—for the total of all steps in its analysis.

Here we are looking at just the final step in processing the results.

What are the possible outcomes?

What is a likely scenario if the laboratory jiggered the data on the EDFs so that they would confirm their initial analysis?

By what criteria should the EDFs fail Botrè's test?

(Unfortunately, the arbitration panel never decided this ahead of time.)

In one scenario, the laboratory would have fixed the files so that the MassLynx analysis matched, or nearly matched their initial results.

However, since they did not expect that data would be reprocessed on the original machine, with the original software, performed by the original operator, they might have not correctly jiggered that part of the file to work properly.

Alternatively, they might not have been able to jigger the file to work properly on both the OS2 software and the MassLynx, and so jiggered it to be close on MassLynx.

This is exactly what we see.

Clearly, overall, the results are all over the place.

Again, keeping in mind that the laboratory asserts a measurement uncertainty of 0.8 delta units—for the total of all steps in its analysis, and that here we are looking at just the final step in processing the results.

Against Landis, the four MassLynx subtraction values are within 0.8 delta unit of the original reported results. (Albeit significantly impacting the measurement uncertainty budget.)

Inexplicably, when the EDFs Botrè was given were rerun on the original machine, with the original software, by the same operator who first analyzed them, three out of four of the manually derived metabolites (the same method used in the original processing) were 0.8 or more delta units different than when they were originally verified as accurate results.

The Etio subtraction value is 1.67 delta units different.

The Andro is 1.90 delta units different.

This represents more than 200% of the lab's own stated total measure of uncertainty.

By Botrè's own test design and by the laboratory's own stated accuracy, the files cannot be certified as original.

### \*\*\*6I. Only One Metabolite Abnormal Not a True Finding Fundamental Positivity Criterion Flawed

Arnie's comment:

This is the best *interpretive* defense. Even if one ignores all the *procedural* errors in the analysis, which one cannot, this argument is not about reversing a positive test or “getting off on a technicality.” It is about the test never having been adverse in the first place.

#### One Metabolite is Not Enough—By LNDD's Own SOP Analysis Absurdity

LNDD's quality control SOP provides evidence that at least two metabolite subtraction values must be abnormal in order to call a test positive.

As noted in USADA's AAA pre-hearing brief:<sup>300</sup>

80. LNDD checked overall assay quality by injecting a Blank Urine (“Blu” in the injection sequence) from the same Blank Urine pool immediately before each of the three fractions of Respondent's urine was injected. The initial delta/delta value for each testosterone metabolite – endogenous reference compound – was calculated the first time the Blank Urine pool was analyzed (Exhibit 26, pages LNDD 0309-0310). Then with every subsequent IRMS confirmation, one aliquot of Blank Urine in this pool was tested side-by-side with a sample. LNDD checks assay performance and the accuracy of each day's results by making sure that, of the four delta/delta values for the Blank Urine, at least three agree with LNDD's “initial” values.

As a method of quality control and assessment, the LNDD runs a blank (negative) urine.

To pass quality control, three out of four measured subtraction delta values must be within 0.8 delta units of “initial” values.

In other words, if three are within 0.8 delta units, and one measurement is off-the-charts, the test is still satisfactory and quality control is acceptable.

If a known negative control urine (blanc urine, Blu) can pass quality control with one subtraction value metabolite abnormal, by this standard, an athlete's sample must also pass. It makes no sense that a known negative urine can pass quality control and yet be labeled a positive for doping.

LNDD Blu (Negative Control)	Etio	Andro	5β- Adiol	5α- Adiol	Result
If as control	Within uncertainty	Within uncertainty	Within uncertainty	Abnormal	PASS
If as athlete	Within uncertainty	Within uncertainty	Within uncertainty	Abnormal	FAIL

**Table 30. LNDD testing absurdity. With just one metabolite abnormal, as in Landis's test, the laboratory would certify its own negative control as accurate, yet call it a doping positive.**

Arnie's comment:

By LNDD's own quality control standards, Landis's 'B' sample tests results, with 3 out of 4 subtraction delta values within the margin of error for negative results, must *not* be declared positive.

<sup>300</sup> USADA AAA Pre-Hearing Brief, April 16, 2007, p.39, ¶80.  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

## All Metabolites Positive Should be the Standard

All metabolites need to be positive to issue an adverse analytical finding. There are strong scientific, statistical, and legal reasons to argue this point.

### Scientific Arguments

Arnie's comment:

I have performed a web review of the literature of published studies of IRMS, symposia, laboratory standards, and CAS case law.

In every study, all metabolites examined were abnormal.

In no case was a positive test ever suggested based on a single metabolite.

From a test design statistical analysis, the use of any or one is unsupported and unsound.

A table summarizing this review is found in the appendix beginning on page 286.

### USADA0892

UCLA is the largest anti-doping laboratory in the world. It performs three times as many tests as the number two lab.

Don Catlin, UCLA Laboratory Director has said that calling a sample positive when only the alpha-diol is abnormal is a problem. In response to a question at the 2<sup>nd</sup> Annual USADA Symposium on Anti-Doping Science (2003) on the Application of Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry to Doping Control, Catlin stated:<sup>301</sup>

"Not only do you have to be able to prove it, you better well have a lot of clinical studies that demonstrate it or you will lose in the CAS." (See Figure 145.)

No such studies have been published.

<sup>301</sup> 2<sup>nd</sup> Annual USADA Symposium on Anti-Doping Science. Application of Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry to Doping Control. Los Angeles. Page 77. (2003). USADA0882. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

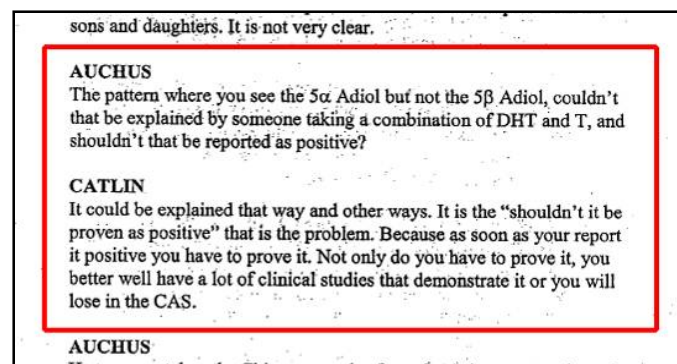


Figure 145. USADA0892. Calling a sample positive based on the 5-alpha diol but not the 5-beta diol is a mistake.

Reportedly, Travis Tygart, in a 2007 interview with a congressional lobbyist about this case, stated that the UCLA laboratory changed their criteria to a single metabolite in 2004.

### USADA1010.

In a document USADA released in discovery, Don Catlin, UCLA Laboratory Director, reaffirms they all must be abnormal. He reaffirms that a pair of metabolites must be measured—and if sufficient urine is present to allow only one to be measured, an abnormality of one is insufficient to call a test positive. See Figure 146.

W	High	-26.3	-26.6	-26.8	-26.2	-23.4	6.4	4.8	Adverse finding
M	High	-24.5	-24.6	-30.4	-30.9	-22.8	7.6	8.1	Adverse finding

Four of the 11 samples had  $\delta^{13}\text{C}$  values of one or both of the androstane diols and differences from the 5 $\beta$ -pregnanediol more than 3 SD beyond the mean of our control population(1). Due to low urinary concentrations, the  $\delta^{13}\text{C}$  value of the 5 $\alpha$ -androstane diol could not be measured in 2 of these 4 samples and therefore according to our criteria would be reported as indeterminate while the remaining 2 samples could be reported as adverse findings arising from administration of testosterone or a related compound. The data of the female with a T/E~1 are consistent with a

Figure 146. UCLA reaffirmed in 2005 that the all metabolites criteria still hold: Unless a pair of metabolites is abnormal, the laboratory reports an intermediate or negative result.

## ***Statistical Arguments***

### Reference Range

The LNDD has no control-population reference range.

For details, see page 216.

### All vs. None

Employing an *any* metabolite interpretation results in an unacceptably high false-positive rate.

This point is expanded in the statistical arguments section beginning on page 287.

## ***Legal Arguments***

The 2006 World Anti Doping Code<sup>302</sup> is clear:

“Where an anabolic androgenic steroid is capable of being produced endogenously, a Sample will be deemed to contain such Prohibited Substance where the concentration of such Prohibited Substance or its **metabolites** or markers and/or any other relevant ratio(s) in the Athlete’s Sample so deviates from the range of values normally found in humans that it is unlikely to be consistent with normal endogenous production.”

The UCLA Olympic Laboratory criteria:

“A positive report means that the delta values for both M1 and M2 are at least three standard devious (SD) units less than the mean (average) of a group of 73 normal males, and the delta value for Pdiol is within 3SD of the mean of normal males. In addition... the two differences are more than 3 SD from the range of normal values.

These criteria... **all must be met** for the sample to be declared positive.”<sup>303</sup>

Arnie’s comment:

Paul Scott, a lab insider who left the UCLA laboratory in the fall of 2006, reports that the UCLA laboratory still uses this same standard: all metabolites must be positive.

The 2004 WADA technical document<sup>304</sup> states:

“The results will be reported as consistent with the administration of a steroid when the <sup>13</sup>C/<sup>12</sup>C value measured for the **metabolite(s)** differs significantly i.e. by 3 delta units or more from that of the urinary reference steroid chosen.”

Arnie’s comment:

This is the only potentially ambiguous statement I have seen from WADA.

From the correction of this statement from metabolite(s) (2004) to metabolites (2006), I infer rectification of any ambiguity.

This statement also fails to specify whether the delta units are corrected or uncorrected values: Major changes to the false-positive rate may result. For a fuller discussion, see statistical arguments section beginning on page 287.

<sup>302</sup> World Anti-Doping Code The 2006 Prohibited List 3. (2006). [http://www.wada-ama.org/rtecontent/document/criteria\\_1\\_2.pdf](http://www.wada-ama.org/rtecontent/document/criteria_1_2.pdf). “The WADA code is the basic (governing) document we monitor.” –Dick Pound teleconference, September 14, 2006. <http://web.mac.com/carltonreid/iWeb/6FA340D1-93FD-4E2E-B666-BD04ABB6A705/789A39D5-D7E0-4C25-B130-946615E2C831/1F498E91-3648-44AE-92CD-3D50971B6EF7.html>.

<sup>303</sup> UCLA Olympic Laboratory. Client CIR Notice.1. Jun 22, 2001.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>304</sup> WADA TD2004EAAS. 3. (2004). Reporting and evaluation guidance for testosterone, epitestosterone, T/E ratio and other endogenous steroids. [http://www.wada-ama.org/rtecontent/document/end\\_steroids\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/end_steroids_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.



According to the World Anti-Doping Code;<sup>305</sup>

“The World-Anti-Doping program encompasses all of the elements needed in order to endure optimal harmonization and best practice in international and nation anti-doping programs. The main elements are:

Level 1. The Code

Level 2. International Standards

Level 3: Models of Best Practice”

The Code then goes on to elaborate on the levels—with some detail on page 2 and in the comments section.

The bottom line: The code takes precedence over the technical documents.

In 2006, the WADA-approved Swiss laboratory published the following in two separate papers:<sup>306, 307</sup>

“According to the technical document of the WADA Laboratory Committee, an athlete would be reported as consistent with the administration of a steroid when the <sup>13</sup>C/<sup>12</sup>C-value measured for the **metabolites** differs significantly, i.e. by 3.0‰ or more from that of the urinary reference steroid chosen.”

In the recently published (September 2006) CAS arbitration, *UCI v/Barry Forde & Barbados Cycling Union*, the following was published:<sup>308</sup>

<sup>305</sup> WADA World Anti-Doping Code 1. (2003). [http://www.wada-ama.org/rtecontent/document/code\\_v3.pdf](http://www.wada-ama.org/rtecontent/document/code_v3.pdf). Accessed Dec 28, 2006.

<sup>306</sup> Baume N, et al. Use of isotope ratio mass spectrometry to detect doping with oral testosterone undecanoate: inter-individual variability of <sup>13</sup>C/<sup>12</sup>C ratio. *Steroids*. 75:369. (2006). Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>307</sup> Saudan C, et al. Longitudinal profiling of urinary steroids by gas chromatography/combustion/isotope ratio mass spectrometry: Diet change may result in carbon isotopic variations. *Journal of Chromatography B*. 831, page 327. (2006). [http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list\\_uids=16338181&dopt=Abstract](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=16338181&dopt=Abstract). Accessed Dec 28, 2006.

<sup>308</sup> CAS 2006/A/1057 *UCI v/Barry Forde & Barbados Cycling Union*. 12, page 3. (2006). <http://www.tas-cas.org/en/juris/frmjur.htm>. Accessed Dec 28, 2006.

“On 3 February 2006, the LNDD delivered its analysis report of the ‘B’ sample and confirmed that (as translated from French by the Appellant) “Analysis by isotopic ratio mass spectrometry indicates an exogenous origin of the testosterone metabolites, consistent with the taking of testosterone or one of its precursors. – The exogenous origin of the testosterone metabolites was objectified on the basis of an isotopic reduction of -6.33 0/00 and =5.29 0/00 respectively for the **5-beta androstanediol and 5-alpha androstanediol metabolites.**”

In his September 6<sup>th</sup> dismissal submission to the USADA independent anti-doping review board,<sup>309</sup> attorney Howard Jacobs wrote: “Furthermore, any notion that WADA intended otherwise, or that the WADA-accredited laboratories clearly understood that this positivity criteria would only require a showing of a single metabolite as exceeding the threshold, is easily dismissed by the following published statement by the WADA-accredited laboratory in Lausanne, which statement shortly post-dates the effective date of the WADA Technical Document TD2004EAAS:

‘What are the IRMS criteria to determine endogenous T ingestion, that is, do **all** the measured T metabolite  $\delta^{13}\text{C}$ -values or does **only one** have to be superior to 4‰.’”<sup>310</sup>

### Varying Rules

We now have two non-positive results from the UCLA laboratory that LNDD would apparently call positive.<sup>311</sup>

<sup>309</sup> Jacobs, H. Dismissal submission to USADA. September 7, 2006.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>310</sup> Maitre A, et al., Urinary analysis of four testosterone metabolites and pregnanediol by gc-cirms after oral administrations of testosterone. *J Anal Toxicol*. 28, 430 (2004).

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>311</sup> UCLA one-metabolite negatives. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

Arnie's comment:

This is unfair and absurd.

WADA lists<sup>312</sup> as future technical documents:

- Measurement of Uncertainty for Anti-Doping Analysis.
- Reporting Guidance for Gas Chromatography/Combustion/Isotope Ratio.

Will Geoghegan's comment:<sup>313</sup>

This implies that they acknowledge the *need* for such documents.

One may infer that WADA labs are operating without a consistent technical approach for either.

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<sup>312</sup> WADA International Standard for Laboratories, p. 57. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>313</sup> Will Geoghegan, Floyd's manager.

**\*\*\*6J. LNDD Has No Reference Range Population  
No Reference Standard or Reference Collection  
No Method Validation**

**ISL Violation<sup>314</sup>**

ISL 5.4.4.2.1:<sup>315</sup>

“Reference standards should be used for identification, if available. If there is no reference standard available, the use of data or sample from a validated Reference Collection is acceptable.”

A reference collection is defined as:<sup>316</sup>

“A collection of samples of known origin that may be used in the determination of the identity of an unknown substance. For example, a well characterized sample obtained from a verified administration study in which scientific documentation of the identity of Metabolite(s) can be demonstrated.”

Fundamental to the validity of the IRMS method is for each laboratory to develop its own reference range based on its own reference standards.

This is crucial because different labs have different machines, different software, use different reference materials, and have different methodologies.

**A Reference Solution Was Available**

We know through discovery documents that LNDD is in possession of reference standards that would allow them to easily make a reference solution.

The *Mix Cal Acetate*, as on USADA0354, is used in the IRMS process to help verify the calibration of the instrument. It *cannot* be used in identification because there is no 5-alpha androstanediol, no androsterone, and no pregnanediol in the mix.

The lab purchased these three missing analytes and could have easily added these to the mix cal acetate to create a bone fide reference standard.<sup>317</sup>

**Validation Need Confirmed at AAA Pre-Arbitration**

At a pre-arbitration AAA hearing, Richard Young, USADA’s lead attorney confirmed the need for validation in order to achieve accreditation:<sup>318</sup>

Pre-AAA Hearing Transcript

Page 100

4 MR. YOUNG: Okay. Let me just start at the  
5 beginning and explain how the process works.  
6 I’m a laboratory and I want to use the IRMS  
7 method to detect testosterone. And I have my new ISO  
8 Prime unit and I plug it in. Not only am I going to  
9 follow the specific WADA positivity criteria of 3 delta  
10 delta units, 1 metabolite, I need to demonstrate that my  
11 machine works in my application with the particular  
12 process I use for this method in my laboratory on that  
13 machine.  
14 And so I have to -- we know that the IRMS method  
15 works generally. But I have to demonstrate that I can  
16 make it work on my machine in my lab. And so I do  
17 validation studies on samples. And as part of that study,  
18 I measure what my uncertainty is, using standard  
19 approaches that laboratories use for that kind of thing.  
20 I may be slightly better in my laboratory at one

<sup>314</sup> For more on the significance of ISL and other violations, see page 16.

<sup>315</sup> WADA International Standard for Laboratories. 5.4.4.2.1 (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>316</sup> WADA International Standard for Laboratories. 3.2 (2004).

<sup>317</sup> Records for the purchase: 5-alpha androstanediol at LNDD0287, androsterone at LNDD0284, and pregnanediol at LNDD0278.

<sup>318</sup> The Pre-AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

21 inch shot groups than Matt is. I may have a level of  
22 uncertainty of 0.4 and Matt may have a level of  
23 uncertainty of 0.8, because my rifle is -- for whatever  
24 reason -- slightly more accurate. And the measure of  
25 uncertainty between different labs and different methods

Pre-AAA Hearing Transcript Page 101  
1 is always there and it's always different, because we all  
2 do things slightly differently in the methodology and you  
3 always have slightly smaller shot groups.  
4 The next thing that happens in this process is  
5 that the international standard says that for me to be  
6 using this method, I need to get it ISO certified. And  
7 they don't just ISO certify the lab -- ***I mean, they do ISO***  
8 ***certify the lab -- but they also ISO certify particular***  
9 ***methods that are employed by the lab.*** [Emphasis added.]

### ***Validation Need Repeatedly Reaffirmed by Anti-Doping Authorities***

1. From Christiane Ayotte, WADA-Approved Montreal Lab Director and USADA expert, at the AAA hearing. <sup>319</sup>

AAA Hearing Transcript Page 856  
13 Q. Notwithstanding the fact that WADA  
14 went to great lengths to prepare this  
15 document -- I'm just going to set this here --  
16 you would agree that the laboratory still has to  
17 carry out validation to show that its testing  
18 can be done in accordance with what is set out  
19 on this technical document, right?  
20 A. Yes.

<sup>319</sup> The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

2. From the IOC Working Group for Isotope Ratio Mass Spectrometry Analysis:<sup>320</sup>

“Decision Criteria:

Each laboratory using GC/C-IRMS should determine its own population reference range with a minimum of 50 volunteer samples from healthy subjects without using therapeutic and by IOC banned substances.”

The population reference range will be calculated with 99.9% confidence interval (e.g. mean  $\pm 3SD$  for normal distribution).<sup>321</sup>

A sample will be considered as analytical positive when the difference of the ratio of the  $\delta$ -values between analyte and ERC is outside the population reference range.” [Emphasis added.]

3. From the 2<sup>nd</sup> Annual USADA Symposium on Anti-Doping Science (2003) on the Application of Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry to Doping Control.<sup>322</sup>

“Recommendations and Conclusions

USADA should fund a 50-subject reference range study in the eleven labs current reporting GC/C-IRMS data.

A Reference Material and/or Internal Standard material should be developed to assist the laboratories in achieving more uniform results.”

Paul Scott's comment:  
This has never been done.

<sup>320</sup> Manfred Donike Workshop (2002). Analytical Criteria for IRMS. USADA0733. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>321</sup> Please keep in mind that *3 delta units* may sound like *3 standard deviations* but they are not the same and many have confused these terms. Both expressions have the value 3. However, if the 3 delta cutoff corresponds to 3 standard deviations, that will only be a coincidence.

<sup>322</sup> 2<sup>nd</sup> Annual USADA Symposium on Anti-Doping Science. Application of Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry to Doping Control. Los Angeles. (2003). USADA0864. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

4. From the 2<sup>nd</sup> Annual USADA Symposium on Anti-Doping Science (2003) on the Application of Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry to Doping Control:

Verkouteren, R. M. Standardization of Isotope Ratio Measurements for Doping Control:

“While individual laboratories have successfully applied GCC-IRMS for isotopic measurements of steroids, little is actually known regarding the reproducibility of these measurements across laboratories since standard practices and reliable reference materials do not exist on which to base an assessment. The IOC and USADA have articulated the need to establish a harmonized international network of laboratories, with each laboratory proven to be equivalent in analytical performance. Measurements from such a network of laboratories, with each laboratory proven to be equivalent in analytical performance. Measurements from such a network would provide sound and globally equitable data needed to support and strengthen decisions made by IOC officials and foster confidence in those decisions.”

#### RECOMMENDATIONS

The following recommendations are offered to help achieve the goal of international harmonization in GC-C-IRMS performance and results:

1. Identify specific analytical targets and acceptable limits of measurement uncertainty that are based on tolerable risks of false negative and false positive results.
2. Develop a suitable urine RMs, covering the range of observed steroid isotopic values, and assign documented isotopic values and uncertainties that are traceable to VPDB.
3. Develop performance-based standards to assess data quality through intercomparisons and proficiency tests.
4. In comparing two steroid measurements for a significant difference ( $\Delta\delta$ ), these measurements should be performed under identical conditions and referenced to a RM to establish traceability to VPDB. Standard uncertainties of these two measurements can be used in a two-sided normal test (e.g., Natrella, 1963, Section 3-3.1.3) to determine whether the mean results are statistically distinct at a specified confidence level.

Figure 147. USADA0885. Verkouteren’s specific recommendations. As discussed here and in our statistical arguments, the LNDD has no control reference range, and so cannot have established tolerable risks of false-negative and false-positive rates.

5. From Dr. Hemmersbach, WADA Laboratory Committee:<sup>323</sup>

On the need for laboratories to establish validation based on their own control populations, Hemmersbach wrote:

“Even if a standard procedure were transferred to the laboratory to follow, the laboratory would be required to carry out its own validation.”

Hemmersbach continues to give an example:

“[N]o analytical false positives occur by determining that for several hundred known negative samples, the analytical system did not detect any false positive results.”

#### 3. Method validation in qualitative methods

- 3.1. Method validation is an important process that occurs simultaneously with method development.
- 3.2. The term validation is used by different groups in different ways. From the laboratory perspective, validation is the confirmation that the method is fit for purpose. Validation is also used in some circles to refer to “proof of concept.”
- 3.3. Validation is carried out in the laboratory performing the test, in this case the LAD. Even if a standard procedure were transferred to the laboratory to follow, the laboratory would be required to carry out its own validation. The extent of the validation is determined by what information is available from previous studies and experience. From reviewing Dr. Saugy’s testimony, the LAD did a validation study for the flow cytometry method.
- 3.4. Validation for a qualitative test differs from a quantitative test. The WADA ISL discussed the validation of these two types of tests separately.
- 3.5. From the perspective of the ISL and reviewing the written testimony of Dr. Saugy for this hearing, the laboratory appears to have established that no analytical false positives occur by determining that for several hundred known negative samples, the analytical system did not detect any false positive results.

Figure 148. Hemmersbach method validation (WADA) witness statement.

<sup>323</sup> Peter Hemmersbach, PhD Witness statement December 8, 2005. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

### LNDD Reference Range NOT a Reference Collection

As noted in claimant's discovery letter of February 7, 2006, Exhibit B, page 10, the LNDD has not developed its own reference population. "The reference range is based on athlete samples reported negative, *not on a known population* of controlled research subjects." [Emphasis added.]

17. (1) The requested documents fall within the scope of LNDD's ISO accreditation. (2) The requested documents fall within the scope of LNDD's ISO accreditation; however, the highs and lows of the reference range are set forth in the laboratory documentation package. See USADA page 352. The term "haute" means high. The term "basse" means low. (3) This was not calculated. (4) The requested documents fall within the scope of LNDD's ISO accreditation. The reference range is based on athlete samples reported negative, not on a known population of controlled research subjects. The reference range is used merely for comparison and information.

Figure 149. LNDD Exhibit B, page 10. Reported highs and lows are those of athletes reported as negative.

LNDD previously declared samples negative when the ratio of the metabolite to the endogenous reference compound was less than 1.12.

This criterion is looser, and results in more false positives, than the criterion previously and still currently used by Australia: 1.15. Here is a screen shot of the Australian rules:<sup>324</sup>

Our laboratory like many others use a combination of criteria to assess whether a sample is positive. Our current criteria are –

1. The difference between the average of  $\delta^{13}\text{C}$  A and  $\delta^{13}\text{C}$  Et values, and  $\delta^{13}\text{C}$  11-keto must be greater than 4.0‰.
2. The ratio must be greater than 1.15.
3.  $\delta^{13}\text{C}$  A and  $\delta^{13}\text{C}$  Et must be more negative than -27.0‰.

All must be met for a sample to be called positive.

Figure 150. Screenshot of Australian IRMS positivity criteria.

<sup>324</sup> Australian Sports DTL Anti-Doping Research Program. 6. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 30, 2006.

Note that the Australian rules require the subtraction values *and* the ratio of *all* metabolites to be abnormal to declare a positive.

At the UCLA laboratory, to meet the criterion of 3 standard deviations, the ratio of the 5-alpha androstenediol to 5-beta pregnanediol must exceed 1.17.<sup>325</sup>

	Ratio	
	5 $\beta$ A/5 $\beta$ P	5 $\alpha$ A/5 $\beta$ P
Mean	1.06	1.09
SD	0.028	0.027
CV, %	2.7	2.5
Mean + 3 SD	1.14	1.17
Mean – 3 SD	0.97	1.00
Maximum	1.13	1.16
Minimum	1.00	1.01
Max – Min		

Figure 151. USADA0815. Aguilera 2001. At the UCLA laboratory, to meet the criterion of 3 standard deviations, the ratio of the 5-alpha androstenediol to 5-beta pregnanediol must exceed 1.17.

It is impossible to assess accurately the false-positive rate of LNDD based on its own reference population—because there is no such population.

The LNDD has had no internal means to determine if its IRMS criteria are valid. It has no means to determine whether the cutoffs it uses—for its machines and procedures—are set at 3 standard deviations, or any other level.

By accepting a cutoff of 3 delta units, without knowing how many standard deviations that represents in its own population and testing methods, the LNDD is effectively saying: "Tests we have called negative fall below this value. Therefore if a result is above this value, it is positive" or "If we call a test positive, it is positive because we say so."

<sup>325</sup> Aguilera, R et al. Performance Characteristics of a Carbon Isotope Ratio Method for Detecting Doping with Testosterone Based on Urine Diols: Controls and Athletes with Elevated Testosterone/Epi-testosterone Ratios. Clinical Chemistry 47 (2) 296. (2001), USADA0815. Linked at: <http://arniebakercycling.com/books/wiki.htm>.



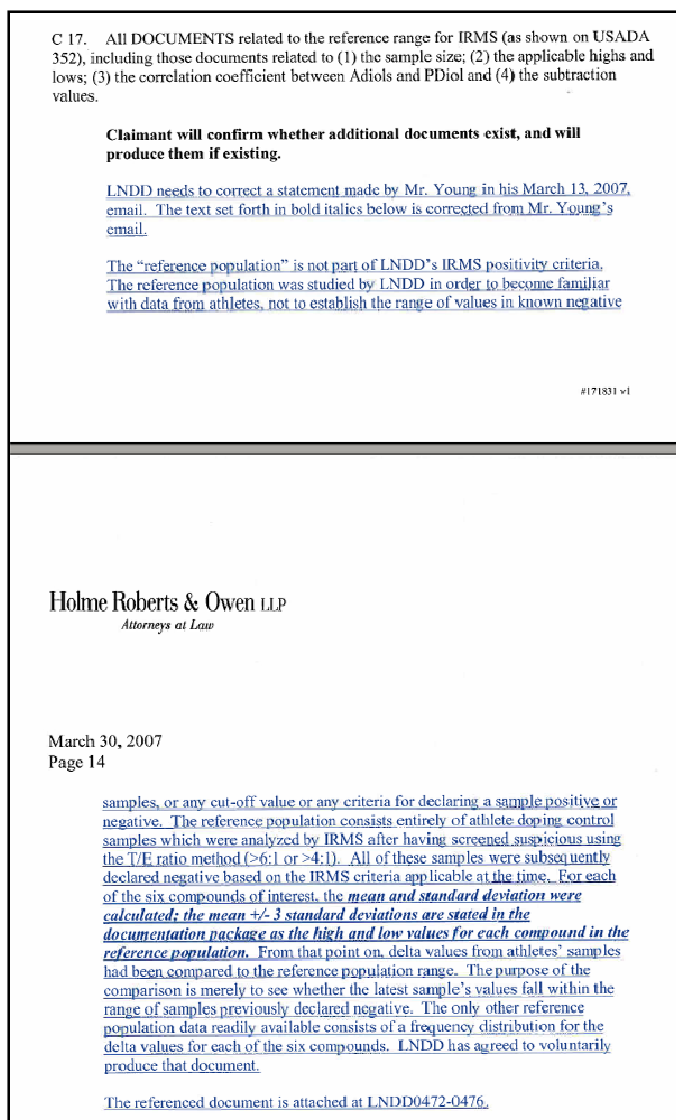


Figure 152. Letter from USADA: LNDD does not use a reference population as part of its positivity criteria.

## LNDD0198

The LNDD Laboratory Director has stated: "To my opinion, the two different manners in expressing the isotopic depletion results were very close and the 13Cδ‰ depletion value of 3 recommended by WADA can be regarded as the result of a successful harmonization contrary to what Dr. Baker has declared in this new document."

Arnie's comment:

The Laboratory Director has no basis on which to assess his laboratory's accuracy. I find it surprisingly that Ceaurriz apparently does not understand the meaning of measurement uncertainty or validation study.

See also the next page:



## Contradictory LNDD Statements About Reference Range?

### Letter to Rabin

The Laboratory Director may have given contradictory statements.

Above, as we have outlined, Ceaurriz states that there is no control population and that the reference values given are merely the highs and lows of values deemed negative.

In a document (unverified) written to WADA science director Oliver Rabin, regarding Landaluce, Ceaurriz wrote:

“En ce qui concerne la valeur critique de – 3 ‰ pour l'appauvrissement « recommencée (sic) par l'AMA » le laboratoire a vérifié sur plus de 400 échantillons que cette valeur était pertinente pour tous les métabolites de la testostérone et par conséquent a adopté sans réserve cette valeur critique.”

WorldLingo translation:

“With regard to the breaking value of – 3 ‰ for impoverishment recommended by the AMA, the laboratory checked on more than 400 samples that this value was relevant for all the metabolites of testosterone and consequently adopted without reserve this breaking value.”

Arnie's comment:

I read this as implying a control group of 400 subjects.

Ceaurriz is apparently stating that the LNDD adopted the test cutoffs based on being satisfied that in testing more than 400 subjects those values previously called negative are still negative and those previously called positive are still positive. This is circular reasoning. Scientific basis for the criteria have not been provided; no verification study exists.

Again, apparently, Ceaurriz does not understand the meaning of a validation study or he is being disingenuous in claiming he has scientifically validated the 3‰ delta value.

Châteauneuf, le 12 juillet 2006

**TRANSMISSION DE TELECOPIE**

<b>Expéditeur :</b> J. de CEAURRIZ Foncteur du Laboratoire l'atmosphère de Capitaine de Drogue	<b>Destinataire :</b> O. RABIN Organisation AMA Fax : 003 514 904 87 69
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Tél : +33 (0) 1 46 60 28 69  
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e-mail : devchen@lndd.com

Nombre de pages y compris celle-ci :

1/2

Cher Olivier,

Je te prie de trouver ci-joint le profil d'entretien de Landaluce que j'ai adressé à l'UCL suite à sa demande ainsi qu'à Martel en tant que expert de l'UCL auprès du TAS (ci-joint).

L'échantillon 93/06\_87404 est celui qui a fait l'objet d'une analyse positive à l'IRMS (2 métabolites). Le laboratoire a par ailleurs déclaré comme suspect l'échantillon 92/06\_872330 (Douchine, Libéré) et l'échantillon 33/07\_873887 (Tour de France) sur la base d'un appauvrissement isotopique du  $\delta^{13}\text{C}$  de -4,6 et de -3,3 pour le 5 $\beta$ -androstenediol, respectivement.

Je t'adresse également l'étude de fidélité intermédiaire (pages 37 et 38 de notre document de validation) qui a servi à déterminer l'incertitude de 0,8 ‰ ainsi qu'une mise à l'épreuve de ce résultat sur une urine témoin et sur une urine positive (pages 47 et 48) de notre document de validation.

1/2

En ce qui concerne l'identification des métabolites de la Testostérone dans les différentes fractions purifiées des échantillons, je te confirme la procédure suivante :

1/ Raccordement des métabolites de l'échantillon (fractions purifiées) à des standards monoséchantillons ou des échantillons correspondants par GC-MS (ci-joint le raccordement qui a été fait pour l'échantillon 87404-B que j'ai également communiqué à l'UCL pour compléter le dossier).

2/ comparaison des profils chromatographiques obtenus par GC-MS et GC-IRMS sachant que l'utilisation d'une colonne identique garantit la sortie des composés d'intérêt des fractions purifiées dans le même ordre malgré des Trv différents.

Je te confirme que l'utilisation du blanc urinaire a pour vocation de tester le bon déroulement de la préparation voire de l'analyse. En fait, ce dernier aspect est surtout dépendant de la validation des performances de l'appareil GC-IRMS.

Je te joins la fiche de vérification correspondante à l'analyse de l'échantillon 87404-B que j'ai également adressée à l'UCL en complément du dossier analytique.

De plus, je te confirme que l'appauvrissement isotopique du 5 $\beta$ -androstenediol est toujours plus important que celui du 5 $\beta$ -androstenediol (-1,8 à -2 ‰). Il s'agit là d'un fractionnement isotopique naturel en relation avec l'isomérisation. Dans tous les cas les appauvrissements isotopiques naturels du 5 $\beta$ -androstenediol sont inférieurs à -3 ‰ et surtout à -3,8 ‰. En ce qui concerne la valeur critique de -3 ‰ pour l'appauvrissement « recommandée par l'AMA » le laboratoire a vérifié sur plus de 400 échantillons que cette valeur était pertinente pour tous les métabolites de la testostérone et par conséquent a adopté sans réserve cette valeur critique.

Cordialement,

J. de CEAURRIZ

2/2

**Figure 153. LNDD director Dr. Ceaurriz appears in this letter to assure WADA science director Dr. Rabin that the LNDD relies on a control group of over 400 subjects in developing its reference range.**

### RADA Document

In Perry, the LNDD wrote:<sup>326</sup>

“We have reported a threshold of positivity that could be applied to absolute value of  $\delta^{13}\text{C}\text{‰}$  (5 $\beta$ -Adiol) in our laboratory. This threshold corresponds to the average value  $\delta^{13}\text{C}\text{‰}$  average value (27.9) + 3 times the standard deviation (0.88) calculated from 78 samples analyzed at the LNDD during one year.”

[They also concluded the article with: “...values... are greatly influenced by instruments parameters (GC column, combustion efficiency, linearity and calibration of the instrument) and inter-individual variation (diet).”]

<sup>326</sup> Perry, M. et al. Influence of pregnenolone administration on IRMS analysis. RADA (8) (2000). Proceedings of the Cologne Workshop on Dope Analysis. Page 211. (2001). <http://proceedings.pulse180.de/>. Accessed Mar 1, 2007.

**\*\*\*6K. No Positive Controls in Run  
Procedure in Most Quality Labs**

**TD2003LDOC Violation<sup>327</sup>**

ISL 5.4.7.3:

Analytical performance should be monitored by operating quality control schemes appropriate to the type and frequency of testing performed by the Laboratory. The range of quality control activities includes:

- *Positive* and *negative controls* analyzed in the same analytical run as the Presumptive Adverse Analytical Finding Sample.
- The use of deuterated or other internal standards or standard addition.
- Comparison of mass spectra or ion ratios from selected ion monitoring (SIM) to a Reference Material or Reference Collection sample analyzed in the same analytical run.
- Confirmation of the ‘A’ and ‘B’ Split Samples.”

TD2003LDOC.<sup>328</sup>

The laboratory document package should contain

“Confirmation procedure data on *negative, positive*, and all Athlete aliquots.” [Emphasis added.]

That is to say, control data must be included.

Laboratories should run random controls (of known value) in their runs as part of quality control. Discussed in the context of both CG/MS and IRMS on page 127.

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<sup>327</sup> For more on the significance of ISL and other violations, see page 16.

<sup>328</sup> WADA TD2003LDOC. Laboratory Documentation Packages. 2, 3 (2003).  
[http://www.wada-ama.org/rtecontent/document/lab\\_docs\\_1\\_3.pdf](http://www.wada-ama.org/rtecontent/document/lab_docs_1_3.pdf). Accessed Dec 28, 2006.

### \*\*\*6L. Negative Control Positive Reprocessing Finds Abnormal Blank Urines

Dr. Botrè, the arbitration-panel appointed expert, supervised the rerunning of allegedly original electronic data files on the original machine, with the original software, by the same operator who first analyzed them. This reprocessing took place on May 4 and May 5, 2007.

When processed (1) automatically with the original software, OS2, and when processed (2) on the more modern MassLynx software, the so-called known negative control urine (Blu, blank urine) was determined to have delta values and delta/delta values for the 5-alpha androstenediol analyte that were abnormal.

By LNDD criteria, the known negative urine would have been called an adverse analytical finding.

<b>“Negative” Control</b>	<b>Auto</b>	<b>MassLynx</b>
<b>A Sample</b>		
Etio – 11K	-0.51	0.09
Andro – 11K-Eito	-0.49	-0.59
5β-Adiol – 5β-Pdiol	-0.92	-1.00
5α-Adiol – 5β-Pdiol	-3.65	-2.45
<b>B Sample</b>		
Etio – 11K	-1.11	-0.51
Andro – 11K-Eito	0.03	0.55
5β-Adiol – 5β-Pdiol	-1.33	-1.52
5α-Adiol – 5β-Pdiol	-3.45	-3.66

**Table 31. Reprocessing results in abnormal values for the negative control urine.**

### Absolute Value

In his September 6<sup>th</sup> dismissal submission to the USADA independent anti-doping review board,<sup>329</sup> attorney Howard Jacobs made an argument that blanc (negative control) urine samples yielded values consistent with positive samples.

“...for blanc urines are reported as being -28.40 on the ‘A’ sample (see doc USADA 0185) and -28.31 (see doc USADA 0351) on the ‘B’ sample. These readings, taken from endogenous control samples, are consistent with exogenous testosterone administration.”

#### Arnie’s comment:

***The Blu (blank, control negative urine) is abnormal by LNDD criteria.***

***Either the controls are contaminated, as in the whistleblower documents discussed on page 299, or the lab’s methods are flawed in other ways.***

<sup>329</sup> Jacobs, H. Dismissal submission to USADA. September 7, 2006.  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

## **\*\*6M. LNDD Has No IRMS Operating Manual**

### **ISO Violation<sup>330</sup>**

ISO 17025. 5.4.1.<sup>331</sup>

“The laboratory shall have instructions on the use and operation of all relevant equipment...”

“All instructions, standards, manuals and reference data relevant to the work of the laboratory shall be kept up to date and shall be made readily available to personnel.”

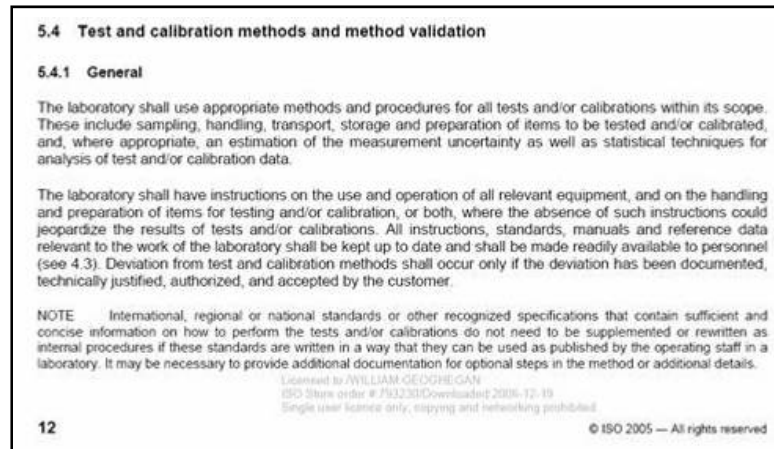
The laboratory has no manual for the IsoPrime IRMS machine. (Claimant’s discovery of February 7, 2006, Exhibit B, page 9)

“The IRMS instrument manufacturer provided to LNDD a working manual corresponding to Isochrom instead of IsoPrime. LNDD has no manual specifically for IsoPrime.”

This is a clear ISO violation.

- c. The IRMS instrument manufacturer provided to LNDD a working manual corresponding to Isochrom instead of IsoPrime. LNDD has no manual specifically for the IsoPrime.

**Figure 154. Discovery document. The LNDD has no working manual about how to operate its IRMS instrument.**



**Figure 155. ISO 17025 5.4.1 documents the need for laboratories to have up-to-date instructions and manuals.**

Arnie’s comment:

The LNDD has had the instrument for years. Did it ever ask the manufacturer to provide a manual? Has it been operating since the beginning without instructions?

<sup>330</sup> For more on the significance of ISL and other violations, see page 16.

<sup>331</sup> International Organization for Standardization. ISO 17025. 5.4.1. (2005). <http://www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=39883>. Accessed Dec 28, 2006.

## **\*\*6N. Pressures**

### ***Driveway/Leaf Blower Analogy***

In some ways, laboratory identification of substances is like a leaf blower on a driveway.

Think of a driveway, leading up to a garage door that is slightly uphill.

Imagine you have a variety of materials—stones, leaves, grass clippings—at the bottom of the driveway.

You turn on a leaf blower, and blow all the materials to your garage door.

Other things being equal, the lighter objects arrive first.

Other things being equal, the smoother objects, with less rolling resistance arrive first.

Other things being equal, the objects with greater aerodynamic drag catch the air and arrive first.

It is not possible to determine the identification of a material based solely on the time it takes to arrive at the garage door. For example: A lighter object, with rough surfaces might arrive as the same time as a heavier object with smooth surfaces.

Now imagine that you have knowledge of substance identification based on arrival time—and then you operate the leaf blower outside of the standard operating speeds: Material identification may be inaccurate or impossible.

### ***LNDD Claims Instrument Working Properly***

The LNDD claims the instrument was working properly in discovery (exhibit B, page 7):

“...requested information is completely unnecessary. The issue should be whether the instruments were working properly at the time Sample #995474 or other relevant sample from Mr. Landis were analyzed.”

“... instrument performance in connection with the analysis of Sample #995474 was verified before the analyses were conducted, for example by tuning and calibrating the instrument, checking for the absence of leaks...”

More importantly, the requested information is completely unnecessary. The issue should be whether the instruments were working properly at the time Sample #995474 or other relevant samples from Mr. Landis were analyzed. Instrument performance in connection with the analysis of Sample #995474 was verified by the use of a known internal standard each time Sample #995474 was analyzed, and known positive and negative controls each time Sample #995474 was analyzed. (One can determine that the assay and instrument were performing properly when the instrument provides data on the internal standards and positive and negative controls within the range that is acceptable, for example for signal strength or measured value.) Furthermore, instrument performance in connection with the analysis of Sample #995474 was verified before the analyses were conducted, for example by tuning and calibrating the instrument, checking for the absence of leaks, checking sensitivity, and in the case of IRMS, checking stability and precision.

**Figure 156. Discovery document. The LNDD claims its IRMS instrument was working properly.**

Wolfram Meier-Augenstein's comment:

Not good enough! What about isotopic linearity, isotopic calibration of compound specific isotope analysis (CSIA) ideally by a 2-point calibration or at least co-injection of one reference material (RM) to demonstrate accuracy?

### ***LNDD Operating Outside of Manufacturer's Specifications***

From the IsoPrime User Manual:

“Wait until the pressure shown on the Penning gauge falls below 5E-6 mbar. If there are no major leaks along the inlet capillaries the pressure will fall quickly and settle to the operating pressure between 2 and 4E-6 mbar. Failure to reach the operating pressure indicated major leaks. These must be cured before proceeding any further.”

Later on the same page, with a triangular yellow warning:

“**Caution:** Ensure that the Penning gauge reading is less the 5E-6 mbar.” [Red, italicized emphasis *not* added; it is from the manual.]

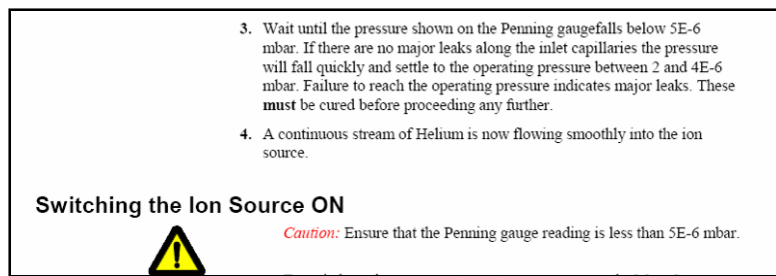


Figure 157. GDC0522. IsoPrime User Manual, page 20. Penning operating pressure requirements.

Simon Davis: “Prolonged use at high pressures ( $> 5\text{E-}6$  mb, will result in damage to the instrument, leading to invalid results. As such, even if a leak had been fixed by the time of the second analysis, the system may have been damaged in a way not seen from the results supplied.

As such, we would require a maintenance log for the machine showing what caused the high pressure, how it was fixed, and what tests were made to insure that the system had not been damaged.

Failure to provide this still leaves significant uncertainty in the B sample analysis.”

#### USADA0176.

The ‘A’ sample Penning pressure is reported as  $5.2 \times 10^{-6}$  millibars. (The ‘B’ sample Penning pressure is reported as  $2.8 \times 10^{-6}$  millibars, USADA0355.)

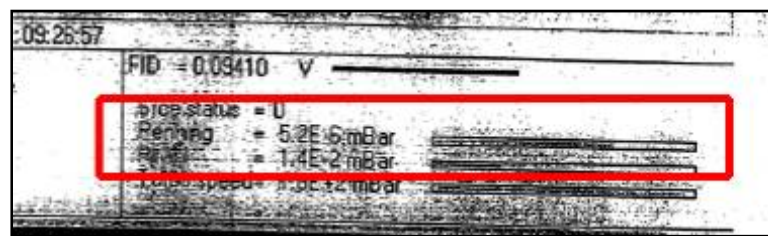


Figure 158. USADA0176. The operating pressure of the IRMS machine was  $5.2 \times 10^{-6}$  millibars. This is outside the manufacturer's specification.

As noted above, the manufacturer specifies that the operating Penning pressure should be between  $2$  and  $4 \times 10^{-6}$  millibars.

#### *The Importance of Pressure*

From Simon Davis:

1. All mass spectrometers must operate in a vacuum, failure to have the correct vacuum results in the collision and disintegration of the analyte ion beam.
2. The correct pressure to maintain an ion beam in the IsoPrime is less than  $5\text{E-}6$  mb.
3. Pressures of, or above,  $5\text{E-}6$  mb will result in the ion beam degrading. This will increase the chance of collision and increase the laboratory's uncertainty factor.
4. Prolonged periods of high pressure will result in the mass spec filament degrading and eventually failing.
5. [Simon later added: Even if subsequent tests are performed at normal pressures, the machine may have been damaged and results may be suspect.]



6. High pressure will result from:
  - a) A leak, which results in interference and increases the instrument's uncertainty factor.
  - b) The pressure from the GC-C being set too high.
  - c) (Wolfram Meier-Augenstein comment:) A change to the split ratio at the source inlet allowing more gas (and, hence sample) to enter in order to overcome sensitivity (detection) problems.
7. If the pressure in the GC-C system is set too high, incomplete combustion may occur in the instrument's furnace, resulting in kinetic fractionation of the sample. This in turn would shift the observed isotopic signature. The high pressure will also result in detrimental aspects similar to those of a leak.

Wolfram Meier-Augenstein's comment:

8. A change in inlet split on the IsoPrime can result in problems with isotopic linearity. Loss of isotopic linearity will adversely affect IRMS results.

Speaking of which, does the laboratory use a GC on their GC/C-IRMS fitted with electronic pressure control to maintain constant column flow?

Arnie's comment:

The laboratory has no operating manual.

The laboratory does not know the manufacturer's specifications.

The laboratory asserts the instrument was working properly and that it was checked for leaks and that none were present.

Possible explanations for the high pressure: "There is either a leak in the capillaries of the reference gas box or along the gas supply lines, or there is not enough helium."<sup>332</sup>

This may cause problems in peak identification, peak integration, calibration, and reliability of data.

### **Possible Lab Argument**

The 'B' sample pressure was fine, and we obtained more or less the same results.

### **Rebuttal**

The laboratory clearly was operating the machine out of specification.

There are other problems in the 'B' sample testing—from degradation, same-operator handling, to questionable peak identification.

The point is: The laboratory erred. Moreover, it apparently lied about pressure, concocting a story about the "green light" (see page 64).

Pressure damage may have altered subsequent readings and the validity of subsequent analysis.

There are many ways to get the wrong answer, and just because you obtain the wrong answer in two different ways does not make it right.

Even a broken clock tells the correct time twice a day.

<sup>332</sup> Conditions for IsoPrime Mass Spectrometer.  
<http://www.eas.slu.edu/People/DLKirschner/pages/StableLabWebpage/Pages/IsoprimeInstructions/IsoprimeMassSpectrometer.htm>. Accessed Jan 14, 2006.



## **\*\*60. Poor Linearity**

### **SOP Violation<sup>333</sup>**

LNDD SOP I-N-29. 4.2.6.2..<sup>334</sup>

“Ce test est à effectuer au moins une fois par mois.”

[Linearity tests are to be conducted a minimum of once per month.]

LNDD	INSTRUCTION	Codification : I-N -29 Version : D Date : 09/05/2006 7 / 14
<p><u>4.2.6.2. Test de linéarité</u></p> <p>Ce test est à effectuer au moins une fois par mois. Il consiste à vérifier l'entendue de domaine de linéarité de l'instrument.</p> <p>Vérifier que la méthode CO2_ROUT est bien chargée : dans la fenêtre Optima GC 1.67-2, sélectionner Mass Spec / Tune Source et Close.</p> <p>LNDD0547</p>		

Figure 159. Linearity tests are to be performed a minimum of once per month.

Linearity or calibration runs are performed on urines cleaned of steroids to which known concentrations of steroids are then added, for example testosterone and epitestosterone.

These are used to show that the machine can accurately measure target substances in concentrations from the lower end to the upper end of expected possible results.

<sup>333</sup> For more on the significance of ISL and other violations, see page 16.

<sup>334</sup> LNDD SOP I-N-29. Notice d'Utilisation du Couplage GC/C/IRMS – IsoPrime1. LNDD0547. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

Simon Davis's comment:

This is totally unacceptable. Monthly runs are insufficient. Runs should be with each batch/daily.

*The need for daily runs is evident in the 'B' sample retesting discussion found on page 244.*

### **Frequency of Testing at Issue**

The LNDD linearity testing dates provided to Landis were:

1. June 26, 2006, roughly a month before the Stage 17 'A' sample
2. July 31, 2006, roughly a week after Landis's 'A' sample run, and
3. September 25, 2006, roughly a month-and-a-half after the 'B' sample run.

### **LNDD0547**

No linearity tests were performed in August, the month of Landis's 'B' sample test.

Tests were conducted July 31, 2006, roughly a week after Landis's 'A' sample run and on September 25, 2006, roughly a month-and-a-half after the 'B' sample run.

The AAA arbitrators found a violation.<sup>335</sup>

Arnie's comment:

Though Landis's IRMS expert Davis believes that monthly runs are insufficient, even this standard was not met by the laboratory. The LNDD violated its own SOP.

### **Using Only Conforming Runs**

Repeating tests until you get one that is satisfactory is shoddy laboratory procedure.

<sup>335</sup> “218. Accordingly, the Respondent has rebutted the presumption that the Lab failed to adhere to the ISL in failing to check the linearity of the IRMS instrument on a monthly basis as provided for in its ISO 17025 accreditation. It is now for the Claimant to demonstrate that this departure did not cause the AAF.” AAA Award. September 20, 2007.

We have evidence that is precisely what the laboratory has been doing: See the ‘B’ sample retesting discussion found on page 255.

## Linearity Out of Specification

IsoPrime-EA User Manual	
Technical specification	
Mass range	1-70 AMU (using electromagnet).
Resolution	The analyser is set to a working resolution of 100 (10% valley definition).
H3+ Contribution (SMOW)	The H3+ contribution is <10 PPM/nA.
Analyser continuous flow specifications	Performed using a reference gas box and continuous flow interface. Applies to all continuous flow modules.
Reference gas precision <sup>13</sup> C	≤ 0.1% (SD 1σ; on the fit of 10 consecutive pulses of 5nA height).
Reference gas precision <sup>15</sup> N	≤ 0.1% (SD 1σ; on the fit of 10 consecutive pulses of 5nA height).
Reference gas linearity <sup>13</sup> C	≤ 0.3% (SD 1σ; on the fit of 10 pulses varying in height between 1-10nA).
Reference gas linearity <sup>15</sup> N	≤ 0.3% (SD 1σ; on the fit of 10 pulses varying in height between 1-10nA).

Figure 160. IsoPrime User Manual, page 17. Reference gas linearity, from 1 nA to 10 nA, should be less than 0.3%.

## Results of Linearity Testing

Simon Davis’s comment:

The linearity is not within specification. For a rough estimate of the deviation, simply look at the largest and smallest 2/1 ratio and subtract one from the other. This gives the variation in per mil values.

Date	High	Low	Deviation	Range nA	Bates
1. June 26, 2006	1.1792	1.1788	0.4 per mil	7.8	LNDD0313
2. June 26, 2006	1.1792	1.1788	0.4	8.3	LNDD0315
3. June 26, 2006	1.1791	1.1788	0.3	8.4	LNDD0317
1. July 31, 2006	1.1779	1.1776	0.3	8.2	LNDD0320
2. July 31, 2006	1.1779	1.1776	0.3	8.4	LNDD0322
3. July 31, 2006	1.1777	1.1775	0.2	8.4	LNDD0324
1. Sept 25, 2006	1.1774	1.1772	0.2	Run 1	LNDD0327
2. Sept 25, 2006	1.1775	1.1771	0.4	Run 2	LNDD0329
3. Sept 25, 2006	1.1774	1.1171	0.3	Run 2	LNDD0331

Table 32. Linearity data. Some deviations exceed 0.3% and are therefore not acceptable.

Wolfram Meier-Augenstein’s comment:

Demonstrating linearity between 2 and 8 nA is next to meaningless if samples fall in a signal range of 1 - 10 nA.

Arnie’s comment:

Based on the IsoPrime manual, some of the instrument deviations exceed 3% and the instrument fails the linearity test.

## Testing Procedure

### LNDD0312 to LNDD0332.

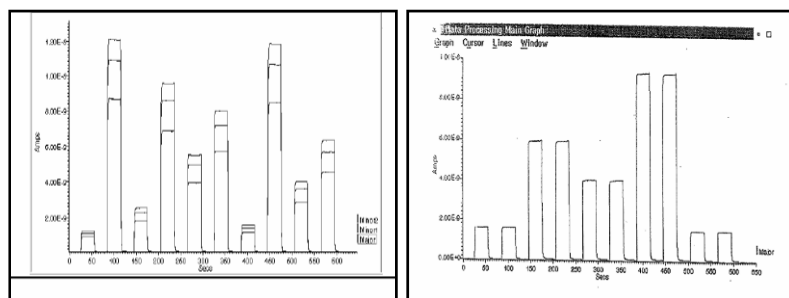
The laboratory appears to have taken shortcuts. According to the IsoPrime operating manual, the reference gas pressure is to be varied randomly 10 times.

The LNDD appears to have run 10 measurements in each run—but varied pressures only 5 times.

According to the IsoPrime user manual, pulses should vary in height between 1 and 10 nA.

In testimony, USADA expert Brenna estimated that linearity was measured down to 1.8 nA.

The 9 nA range, from 1 nA to 10 nA, has been truncated, to below 8 nA in the first June, 2006 run.



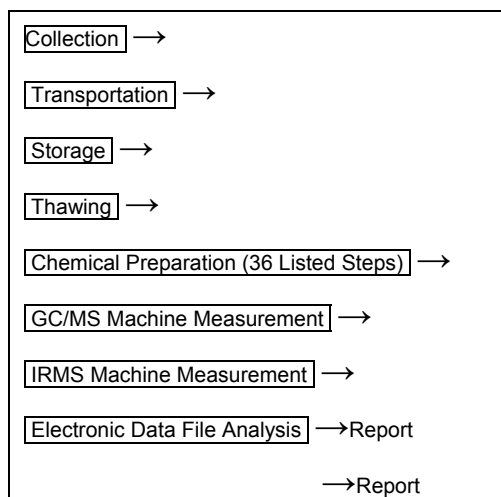
**Figure 161. Linearity procedure. Left: IsoPrime user manual, section 6, page 31. “Checking the system prior to running a sample.” Right: LNDD test, June 26, 2006, LNDD0314. The LNDD took shortcuts—the laboratory did not vary the reference gas pressure 10 times as directed in the user manual, and ran tests with insufficient frequency.**

## **\*\*6P. Measurement Error: Internal Standard Lab's Own Controls Out of Bounds**

### **LNDD0451-0460**

The “measurement error” of “measurement uncertainty” of the IRMS subtraction values can be based on adding known or estimated sources of inaccuracy in analysis.<sup>336</sup>

#### ***The Accuracy Budget***



**Figure 162. The analysis chain. Inaccuracies at any point along the chain can result in erroneous results. In the final link, the electronic data file analysis link, the lab's inaccuracy exceeds 200% of overall stated accuracy budget.**

LNDD0460 and elsewhere states that the tolerable measurement error for a single known reference compound is 0.5‰ for the sum total of *all* errors in *all* steps in its analysis.<sup>337</sup> See Figure 162.

<sup>336</sup> Spirito, E, et al. The role of measurement uncertainty in doping analysis. Int. J Risk Assessment and Management. 5 (2/3/4), 378. (2005). [http://inderscience.metapress.com/\(ecjzvf450gwgboutto2y0c2f\)/app/home/contribution.asp?referrer=parent&backto=issue,16,17;journal,3,12;linkingpublicationresults,1:110887,1](http://inderscience.metapress.com/(ecjzvf450gwgboutto2y0c2f)/app/home/contribution.asp?referrer=parent&backto=issue,16,17;journal,3,12;linkingpublicationresults,1:110887,1). Accessed Dec 28, 2006.

The laboratory asserts a measurement uncertainty of 0.8 delta units for subtraction values (the difference of two compounds).

LNDD determines measurement uncertainty based on empiric evidence: LNDD measures an intra- and inter-day standard deviation and coefficient of variation of a mix of four reference compounds, as well as the four testosterone metabolites and endogenous reference compounds of the same urine tested and retested 30 times.

One of the sources of measurement error of the subtraction values is the measurement error inherent in determining the delta value of any particular metabolite.

LNDD0460 and elsewhere states that the tolerable measurement error for a single known reference compound is 0.5‰.<sup>338</sup>

In using a simple mix of four reference compounds (decane, undecane, dodecane, and methyl-decanoate), LNDD provides a necessary, but not sufficient test.

If LNDD cannot accurately measure these four compounds in a simple matrix, it will certainly have more trouble accurately measuring metabolites in urine, a complex or dirty matrix.

The internal reference standard (SI) 5-alpha androstanol AC is added to the IRMS fractions.

Its fluctuations provide another assessment of laboratory accuracy.

This SI is measured with delta value of -31.54‰ in the blanc urine and -30.11‰ in 995474.

<sup>337</sup> Mongongu, C. et al. Evaluation de la robustesse de l'analyse part GC/C-IRMS pour la détermination de l'origine des hormone stéroïdes. Validation d'un protocole analytique. Congrès de La Société Française de Spectrométrie de Masse. Poster. (2006). <http://www.sfsm.info/ftp/pdf/congres/2006Posters-T5.pdf>. Accessed Apr 23, 2007.

<sup>338</sup> Mongongu, C. et al. Evaluation de la robustesse de l'analyse part GC/C-IRMS pour la détermination de l'origine des hormone stéroïdes. Validation d'un protocole analytique. Congrès de La Société Française de Spectrométrie de Masse. Poster. (2006).

The brute reality is that although the measurement uncertainty of the subtraction of two metabolites is stated to be 0.8, the difference in the androstanol internal standard alone is 1.43 in Landis's 'B' sample batch run of the diol fraction.

#### LNDD0453

Further fueling this argument, the *most* negative value of the internal reference standard 5-alpha androstanol AC ever reported in the diol assay is -30.99‰. However, in the blanc urine run, the value was 0.55‰ more negative: -31.54‰.

*Therefore, the machine is not working correctly or the measurement error is much greater than stated.*

Fraction F3 (Diols)				
Blanc urinaire				
	SI	5β Adiol	5α Adiol	5β Pdiol
Nom du fichier	data_010	data_010	data_010	data_010
tr (s)	872	1323	1354	1674
trr	-	1.517	1.552	1.919
Intensité (nA)	5.3	7.0	2.0	3.3
δ <sup>13</sup> C ‰ mesurée	-31.54	-27.54	-28.31	-26.55
δ <sup>13</sup> C ‰ corrigée	-	-22.18	-23.11	-21.51

Echantillon				
	SI	5β Adiol	5α Adiol	5β Pdiol
Nom du fichier	data_011	data_011	data_011	data_011
tr (s)	872	1318	1352	1671
trr	-	1.512	1.551	1.917
Intensité (nA)	4.1	4.2	2.3	2.6
δ <sup>13</sup> C ‰ mesurée	-30.11	-28.79	-31.88	-26.16
δ <sup>13</sup> C ‰ corrigée	-	-23.69	-27.43	-21.05

Figure 163. The laboratory is unable to measure the internal reference standard in the control and sample diol assay within the required 0.5 delta units. The androstanol value varies by 1.43 delta units (the difference between -30.11 and -31.54).

Arnie's comment:

Consider, by way of analogy, a manufacturer of scales, whose quality control standard is for his scales to measure accurately to within 1 pound.

The manufacturer may have a quality control process to take every 100<sup>th</sup> scale off the assembly line, and subject it to 10 repeated weighings with a known mass of 150 pounds. If the measured values are less than 149 pounds, or greater than 151 pounds, the manufacturer rejects the lot.

In this case, there has been a quality control failure and analysis should be rejected.

Keep in mind that the measurement of the Mix Cal substances represents a basic laboratory hurdle that is necessary, but not sufficient, to assure that the machine is working correctly.

## **\*\*6Q. Measurement Error: Erroneous Conclusion Lab Interpretation Flawed**

### ***Introduction***

“The determination of measurement uncertainty is a critical issue in all fields of experimental science; its importance becomes maximal in the specific case of forensic analytical chemistry (including doping analysis), where uncertainty has not only to be calculated with precision, but it also has to be both small and reliable enough to support effective decision making.”<sup>339</sup>

*Experimental uncertainty* is due to random errors, systematic errors, and mistakes.

- *Random errors* are statistical fluctuations (in either direction) in the measured data. Random errors often result from the experimenter’s inability to take the same measurement in exactly the same way to get exactly the same number.
- *Systematic errors*, by contrast, are reproducible inaccuracies that are consistently in the same direction. Systematic errors are often due to a problem that persists.
- *Mistakes* made in protocol, calculations, or in reading an instrument *are generally not considered in error analysis*. Although test design often assumes that the experimenters are careful and competent, this is often not the case.

In view of material presented elsewhere, we have demonstrated (1) scores of mistakes and (2) the likelihood of systematic errors in view of errors in procedure and the use of old software.

Concerning random errors: Laboratories use different machines, different software, different techniques, and different analysts.

With repeated intra- and inter-laboratory measurement of the same sample as well as different samples, the random errors for any given measurement in any given laboratory can be estimated.

Consider, as a facile example, the measurement of height:

Suppose individuals are screened for selection to a basketball team only if over six feet tall.

One talent scout, Scout A, stands a prospect in a doorway and uses a yardstick. Studies show that he is accurate in measuring height to within one inch.

Another scout, Scout B, uses the span of his hand, which he assumes is nine inches, and estimates height based on number of hand spans. Studies show that he is accurate in measuring height to within six inches.

Role of measurement uncertainty: If you want to be sure that your basketball team will have members over six feet all, considering the measurement uncertainty associated with each talent scout, choose an athlete that Scout A reports as over 6’1” tall. Scout B must report that the athlete is over 6’6” tall.

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<sup>339</sup> Spirito, E, et al. The role of measurement uncertainty in doping analysis. *Int. J Risk Assessment and Management*. 5 (2/3/4), 378. (2005).  
[http://inderscience.metapress.com/\(ecjzvf450gwgboutto2y0c2f\)/app/home/contribution.asp?referrer=parent&backto=issue,16,17;journal,3,12;linkingpublicationresults,1:110887,1](http://inderscience.metapress.com/(ecjzvf450gwgboutto2y0c2f)/app/home/contribution.asp?referrer=parent&backto=issue,16,17;journal,3,12;linkingpublicationresults,1:110887,1).  
Accessed Dec 28, 2006.

### USADA0352.

The conclusion of the IRMS report states that two metabolites were abnormal.

- Androsterone subtraction value is wrongly reported as abnormal. Its value is not beyond the WADA's minimum positivity criteria (3.00‰) plus error range (0.8‰).
- The laboratory report itself notes that the measurement uncertainty places the measured value between -2.71‰ and -4.31‰.
- Sloppy reporting error: Androsterone is erroneously reported as (positive) 3.51‰ rather than (the negative) -3.51‰.

	Blu	Echantillon			
	Δ‰	Δ‰ + 0,8‰	Δ‰	Δ‰ - 0,8‰	
Etio - 11 Kétoétio	-1.08	-1.22	-2.02	-2.82	
Andro - 11 Kétoétio	-0.08	-2.71	-3.51	-4.31	
5β Adiol - 5β Pdiol	-0.67	-1.85	-2.65	-3.45	
5α Adiol - 5β Pdiol	-1.60	-5.59	-6.39	-7.19	

Seuil de positivité de l'AMA:  $\delta^{13}\text{C}\text{‰}(\text{métabolite}) - \delta^{13}\text{C}\text{‰}(\text{composé endogène de référence}) > 3\text{‰}$   
 $\delta^{13}\text{C}$  du composé < -28‰  
Variation maximale admissible liée à la méthode: +/- 0,8‰

**Conclusion**

L'analyse par spectrométrie de masse de rapport isotopique indique une origine exogène des métabolites de la testostérone, cohérente avec une prise de testostérone ou de l'un de ses précurseurs.

L'origine exogène des métabolites de la testostérone a été objectivée sur la base d'un appauvrissement isotopique de 3.51‰ et -6.39‰ respectivement pour les métabolites androsterone et 5α androstanediol.

Figure 164. USADA0352. Red-boxed items: The IRMS report concludes that two metabolites were abnormal. However, considering measurement error, which the laboratory calculates and documents, the androsterone subtraction value is within the range of normal. In the lower red box, androsterone is erroneously reported as 3.51‰ (positive), rather than -3.51‰ (negative).

### LNDD0617.

LNDD's own SOP, E-SEUIL-01, states that a delta value needs to be 3.8‰ to be called a positive.

It calls values less than 3.0 negative and values in between unclassifiable.

Codification : E-SEUIL-01 Version : F Date : 22/03/2006		LNDD0618
7 / 9		
e - Déclaration des résultats		
+/- 20%) IRMS : +/- 0,8‰	IRMS : si $\Delta\delta > -3.0$ : résultat dans les normes si $-3.8 \leq \Delta\delta \leq -3.0$ : résultat inclassable si $\Delta\delta < -3.8$ : résultat hors normes Préciser en nb le rapport 1/E estimé ainsi que les	

Figure 165. LNDD's own SOP requires a delta value of 3.8‰ in order to call a value above normal.

The role of measurement uncertainty is clearly explained in Spirito.<sup>340</sup>

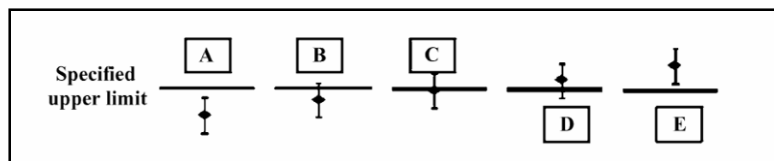
“In practice, to report an adverse analytical finding, it is necessary to identify a prohibited substance, and, in the case of substances with a reporting threshold, to measure a value exceeding the threshold; in the latter case, it is mandatory to express the measurement uncertainty.

<sup>340</sup> Spirito, E, et al. The role of measurement uncertainty in doping analysis. Int. J Risk Assessment and Management. 5 (2/3/4), 378. (2005).  
[http://inderscience.metapress.com/\(ecjzvf450gwgboutto2y0c2f\)/app/home/contribution.asp?referrer=parent&backto=issue,16,17;journal,3,12;linkingpublicationresults,1:110887,1](http://inderscience.metapress.com/(ecjzvf450gwgboutto2y0c2f)/app/home/contribution.asp?referrer=parent&backto=issue,16,17;journal,3,12;linkingpublicationresults,1:110887,1)  
Accessed Dec 28, 2006.



It is not unusual for a result apparently exceeding the threshold, if taken as a single value or even as a mean value to not be correctly reported as 'above the threshold' if the measurement uncertainty is not taken into account.

In (the figure below) it is evident that only case 'E' shows a value that is above the threshold also taking into account the measurement uncertainty."



**Figure 166. From Spirito. The role of measurement uncertainty incorrectly reporting a value above a threshold or specified upper limit. Only case 'E' shows a value that is above the threshold also taking into account the measurement uncertainty.**

Note that the word *threshold* used by Spirito is in the context of a measurement limit or boundary.

This is a different context than the use of *threshold* as a *threshold substance* in terms of WADA definitions in WADA Technical Document TD2004MRPL, where the T/E ratio is listed in a table as a threshold substance and the need for three confirmation samples is mandated.<sup>341</sup>

I *might* agree with CAS/see their point that IRMS is not evaluating a *threshold substance* and three confirmation samples of the IRMS are not mandated, though best practices would suggest that more than one be performed. Indeed this was the explicit recommendation of the *Donike Workshop: Analytical Criteria for IRMS* (USADA0737): Repetition: "... a minimum of two injections for each sample..."

<sup>341</sup> WADA TD2004MRPL. 2. (2004). Minimum required performance limits for detection of prohibited substances. [http://www.wada-ama.org/rtecontent/document/perf\\_limits\\_2.pdf](http://www.wada-ama.org/rtecontent/document/perf_limits_2.pdf). Accessed Dec 28, 2006.

Wolfram Meier-Augenstein's comment:

For this reason, 95% confidence limits is the format of choice to report analytical uncertainties in food standards and food safety compliance.

However, this requires replicates of at least five to be analyzed.

### Summary

1. Spirito is clearly on point.
2. If measurement uncertainty was not relevant, there would be no need or reason for the LNDD to state it.
3. In the document package, USADA0352, the LNDD explicitly provides the calculated delta values, *as well* as the +0.8‰ and the -0.8‰ numbers. For example, in the case of the androsterone, the delta subtraction range of values is: -2.71‰ to -4.31‰. The fact that this is reported in this way makes it clear that this is the range of possible results; that it is entirely possible that a -3.57‰ could really be a -2.77‰.

Arnie's comment:

This error is not only a clear mistake, it reflects a fundamental lack of comprehension about the issue of measurement uncertainty by the Laboratory Director.

If LNDD figures that the -3.0‰ cutoff includes its stated measurement uncertainty of 0.8‰, the impact on its false-positive rate would result in scientifically unsound results.

This lack of comprehension about the role of measurement uncertainty can be generalized to the LNDD director's apparent lack of understanding of measurement uncertainty and statistics concerning the *all* vs. *any* IRMS criterion.

At Arbitration, Thomas Brenna, USADA's own witness, testified that measurement uncertainty should be applied. (See page 379.)

#### **\*6R. All Metabolites Within LNDD Negative Range**

##### **USADA0352.**

All of Landis's absolute (rather than subtraction) IRMS delta values are within the range quoted by LNDD, considering the uncertainty of measurement.

(The LNDD's stated uncertainty for subtraction values is 0.8‰. The uncertainty of any given metabolite must be at least half this value.)

Metabolite	Known Negative-Sample Limits	B Sample With Uncertainty	B Sample
	USADA0352	USADA0352	USADA0352
Etiocholanolone	-19.56 to -26.10	-23.40 to -24.20	-23.80
Androsterone	-18.43 to -25.02	-24.89 to -25.69	-25.29
5β-Androstenediol	-18.55 to -26.97	-23.29 to -24.09	-23.69
5α-Androstenediol	-18.59 to -27.40	-27.03 to -27.83	-27.43

**Table 33. Considering that one-half of the 0.8‰ stated LNDD uncertainty can be ascribed to each of the subtraction metabolites, all of Landis's 'B' sample metabolites fell within the range of the LNDD known negative range.**

#### **\*6S. Metabolites Dependent**

Testosterone interconverts with androstenedione. These two compounds yield the four metabolites commonly measured by IRMS, which interconvert in pairs.

5-alpha androstenediol metabolically interconverts with androsterone. 5-beta androstenediol interconverts with etiocholanolone.

In theory, these four metabolites rise and fall together.

It is rare for one diol to be abnormal while the other is normal. The degree of difference between Landis's diol values is a red flag to analysts that something is wrong with the test.

Read more about this in terms of statistical arguments and common sense on pages 281 to 287.

**\*6T. Absolute Androstanediol Values Negative**

The urinary reference pregnanediol was present,

However, had it not been measurable, Landis's Stage 17 absolute 5-alpha androstandione and 5-beta androstandione results would not meet the criteria of values  $< -28\%$ .

**\*6U. No Replicates**

See *Lack of Replicates* on page 132.

From the Manfred Donike Workshop 2002:

“Repetition: A simple sample preparation and a minimum of two injections for each sample are applied.”<sup>342</sup>

Arnie's comment:

No replicates were performed. Results are therefore questionable.

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<sup>342</sup> Manfred Donike Workshop (2002). Analytical Criteria for IRMS. USADA0737.  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

## \*6V. Mass Balance Formula Wrong LNDD Fails Reference Gas Calculation

### USADA0735.

The starting point for any consideration of how the mixing of two different carbon pools will result in a new composite  $\delta^{13}\text{C}$ -value is the mass balance equation that is written as follows.

$$\delta^{13}\text{C}(\text{product}) = f1 * \delta^{13}\text{C}(\text{precursor 1}) + f2 * \delta^{13}\text{C}(\text{precursor 2})$$

With f1 = number of carbons in precursor 1 / number of carbons in product

And f2 = number of carbons in precursor 2 / number of carbons in product

And f1 + f2 = 1

### LNDD0503.

The formula quoted by LNDD is:

$$\delta^{13}\text{C}(\text{Ac}) = \delta^{13}\text{C}(\text{OAc}) - [\{\delta^{13}\text{C}(\text{OH}) - \delta^{13}\text{C}(\text{OAc})\} \times n/4]$$

D'après la formule de correction citée ci-dessus, la valeur A du rapport isotopique du réactif de dérivation est donnée par la formule suivante :

$$A = \delta_{\text{OAc}} - [(\delta_{\text{OH}} - \delta_{\text{OAc}}) \times n/4]$$

On obtient donc une valeur A du rapport isotopique de l'anhydride acétique égale à -53‰

**Figure 167.** The LNDD formula for calculating its reference gas isotopic value is incorrect.

In this particular instance, the LNDD is looking at 5-beta androstanediol, which explains the mol fraction of n/4 (4 carbons are added through acetylation). In a more generalized form, n/4 is equivalent to mol fraction factor f2 in the mass balance equation.

In our case, this results in:

$$\begin{aligned}\delta^{13}\text{C}(\text{OAc}) &= f1 * \delta^{13}\text{C}(\text{OH}) + f2 * \delta^{13}\text{C}(\text{Ac}) \\ f1 * \delta^{13}\text{C}(\text{OH}) + f2 * \delta^{13}\text{C}(\text{Ac}) &= \delta^{13}\text{C}(\text{OAc})\end{aligned}$$

Since f1 = 1 - f2

$$\begin{aligned}(1-f2) * \delta^{13}\text{C}(\text{OH}) + f2 * \delta^{13}\text{C}(\text{Ac}) &= \delta^{13}\text{C}(\text{OAc}) \\ \delta^{13}\text{C}(\text{OH}) - f2 * \delta^{13}\text{C}(\text{OH}) + f2 * \delta^{13}\text{C}(\text{Ac}) &= \delta^{13}\text{C}(\text{OAc}) \\ f2 * \delta^{13}\text{C}(\text{Ac}) - f2 * \delta^{13}\text{C}(\text{OH}) &= \delta^{13}\text{C}(\text{OAc}) - \delta^{13}\text{C}(\text{OH}) \\ \delta^{13}\text{C}(\text{Ac}) - \delta^{13}\text{C}(\text{OH}) &= (\delta^{13}\text{C}(\text{OAc}) - \delta^{13}\text{C}(\text{OH}))/f2 \\ \delta^{13}\text{C}(\text{Ac}) &= \delta^{13}\text{C}(\text{OH}) + (\delta^{13}\text{C}(\text{OAc}) - \delta^{13}\text{C}(\text{OH}))/f2\end{aligned}$$

Or

$$\delta^{13}\text{C}(\text{Ac}) = \delta^{13}\text{C}(\text{OH}) - (\delta^{13}\text{C}(\text{OH}) - \delta^{13}\text{C}(\text{OAc}))/f2$$

However, LNDD quote

$$\begin{aligned}\delta^{13}\text{C}(\text{Ac}) &= \delta^{13}\text{C}(\text{OAc}) - [\{\delta^{13}\text{C}(\text{OH}) - \delta^{13}\text{C}(\text{OAc})\} \times n/4] \\ \delta^{13}\text{C}(\text{Ac}) &= \delta^{13}\text{C}(\text{OH}) - \{(\delta^{13}\text{C}(\text{OH}) - \delta^{13}\text{C}(\text{OAc})) \times 21/4\}\end{aligned}$$

Since

$$\delta^{13}\text{C}(\text{OH}) = 21.93 \text{ and } \delta^{13}\text{C}(\text{OAc}) = 27.28$$

Wolfram Meier-Augenstein's comment:

1.  $\delta^{13}\text{C}(\text{AC}) = -52.69\%$  and not  $53.00\%$ , the value LNDD uses and claims.
2. The formulae happen to give similar numbers. This is of small comfort that the laboratory knows what it is doing. As an analogy, addition is quite different from multiplication. That  $2 + 2 = 4$  and  $2 \times 2 = 4$  is of small comfort.
3. How can we trust the results if equations used for correction are incorrect?

**Note:** After we noted their error, the laboratory changed its reference gas value—as seen in its 'B' sample retesting reference gas delta value reported for Landis's other Tour samples examined in April, 2007.

## 7. Retesting Tour Samples

### Retesting Introduction

USADA insisted on ‘B’-sample testing of already-tested Tour and post-Tour ‘A’ samples. All these samples already had tested negative. Some of them had already been tested negative by IRMS (isotope ratio mass spectrometry).

USADA wanted these retests even though by WADA’s own rules such testing is illegal, and no one is certain how such testing would have been affected by nine months of storage.

Eventually, USADA retested seven Tour samples and three “control” samples—for a total of 10 samples. USADA decided *not* to test the two out-of-competition negative tests performed at UCLA, tests 51 and 52 in Table 51 on page 308.

Again, this strategy wasted time and money for both USADA and Landis’s defense.

Arnie’s comment:

They got it wrong before; now they were trying to get it wrong again.

As it happened, the retesting allowed our observers to better understand the profound inadequacies of the lab’s machines and testing procedures.

### \*\*\*7A. ‘A’ Samples Negative → ‘B’ Samples Negative

#### ISL Violation<sup>343</sup>

ISL 5.2.4.3.2.3.<sup>344</sup>

“The ‘B’ Sample result must confirm the ‘A’ Sample identification for the Adverse Analytical Finding to be valid.”

ISL 5.2.4.3.2.7.<sup>345</sup>

“If the ‘B’ Sample confirmation does not provide analytical findings that confirm the ‘A’ Sample result, the Sample shall be considered negative and the Testing Authority notified of the new analytical finding.”

The analysts and LNDD director were wrong to report four out of the seven non-Stage 17 Landis 2006 Tour de France samples as adverse analytical findings for testosterone or its precursors.

Having already tested the ‘A’ samples as negative, the only finding allowed by WADA’s own rules is that the ‘B’ samples are also negative.

*This point was made by Panel Arbitrator Campbell in his questioning of Mongongu, as noted on page 403.*

<sup>343</sup> For more on the significance of ISL and other violations, see page 16.

<sup>344</sup> WADA International Standard for Laboratories. 5.2.4.3.2.3. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>345</sup> WADA International Standard for Laboratories. 5.2.4.3.2.7. (2004).

### \*\*\*7B. Observers Denied Access

Landis sent two observers: [Paul Scott](#), former Director of Laboratory Services for UCLA, and [Simon Davis](#), a British researcher and an expert in IRMS machines.

Landis's observers were not allowed to observe the processing of the electronic sample files. Critically, as we have learned, this processing was performed manually, not using the automatic routines of the software, and contrary to the representations that the laboratory made in discovery documents.

Moreover, they were not allowed in the laboratory to observe any procedures or analysis when USADA representatives went home early, even though the LNDD was still analyzing samples.

### \*\*\*7C. Smell Test

For normal T/E ratios, so many positive IRMS tests are unexpected and inexplicable.

The expected rate of confirmation IRMS tests for T/E ratios less than 4.0 is less than a fraction of a percent.<sup>346</sup>

Yet in examining Landis's previously declared negative tests, the laboratory found 4 out of 7 positives—57%.

That argues either that the T/E is a very bad test, or that the laboratory is a bad lab.

	T/E	Number	IRMS Positive	% Positive
Landis	4	7	4	57%
Delbeke Research	4<T/E<6	789	2	0.2%
	10<T/E<15	25	11	44%
	15<T/E<20	9	7	77%
	>20	27	26	96%

**Table 34. Figures from the World Association of Anti-Doping Scientists show that as the T/E ratio declines, the percentage of samples confirmed positive by IRMS declines rapidly.**

<sup>346</sup> “Frans DELBEKE (Belgium – Flemish Community) explained that the World Association of Anti-Doping Scientists (WAADS) conducted a survey on the results of T/E analysis. 25 out of 33 accredited laboratories replied, representing 130, 018 samples. 3265 of these samples produced an adverse analytical finding in 2005. Among these, 955 (29%) of the AAF had 4<T/E<6. These samples had therefore to be confirmed either by IRMS or by reviewing the results of any previous test(s) or conducting subsequent test(s). Only 3 of the 955 samples have been confirmed (2 by IRMS and 1 by follow-up study), but not all laboratories have IRMS and also the outcomes of follow-up or previous tests are not always known by the laboratories. However, only 2 of the 789 samples analyzed by IRMS contained testosterone or its precursors. With regard to cases with T/E >10 which had been analyzed with IRMS, the same survey provided the following results: 10>T/E>15: 11 confirmed, 14 not confirmed 15<T/E<20: 7 confirmed, 2 not confirmed T/E >20: 26 confirmed, 1 not confirmed.” Linked at: <http://arniebakercycling.com/books/wiki.htm>.

### ***Results Don't Match Known Science***

When most, but not all, athletes take testosterone, their T/E ratio rises. These athletes are known as high-mode.

Some athletes have naturally low T/E ratios, and hardly change their ratios at all in response to exogenous testosterone. These athletes are known as low-mode.

Athletes *can* normalize their T/E ratios with epitestosterone doping. Landis's absolute epitestosterone values are low and internally consistent; these are *not* values that suggest epitestosterone doping.

The high T/E ratio reported on Stage 17 implies that Landis is a high-mode responder.

Athletes are high-mode or low-mode; the same individual cannot be both.

That Landis would have a positive test for exogenous testosterone on other stages and a *normal* T/E ratio is inconsistent with known scientific principles.

Arnie's comment:

Lab error is therefore a logical conclusion.

Date	Stage	T/E	T	E	Andro	Etio	5αDiol	5βDiol
7/3/2006	2	2.8	10	3	0.22	-0.95	No result	-1.04
7/11/2006	9	1.3	15	14	-0.25	-1.29	-2.91	-1.05
7/13/2006	11	2.5	17	8	-2.32	-1.99	<b>-4.62</b>	<b>-4.09</b>
7/14/2006	12	1.5	16	13	-1.7	-1.04	-1.01	-0.7
7/18/2006	15	1.8	20	12	-1.22	-1.89	<b>-5.06</b>	-3.56
7/20/2006	17	4.9	47	11	-3.51	-2.02	<b>-6.39</b>	-2.65
7/22/2006	19	2.5	20	10	-1.36	-1.68	<b>-4.8</b>	-1.67
7/23/2006	20	1	8	9	-0.64	-1.43	<b>-4.96</b>	-1.45

**Table 35. Landis's T/E and IRMS results from the 2006 Tour de France. Absolute testosterone (T) and epitestosterone (E) values are in nanograms per milliliter and are corrected for specific gravity.**



**\*\*\*7D (1-6). Why IRMS at LNDD is Inaccurate  
Some Basic Background**

***Chain of Custody***

No recording of transfer of custody from stored ‘B’ samples to recorded containers.

Recording from recall, hours after the fact—non-contemporaneous recording of events.

Paul Scott’s April 16, 2007 comment:

“These guys are screwing up left and right. They have completely broken chain of custody and they have no idea that they have done it.

USADA insisted on “blinding” the samples. I suggested a transfer method to blind them. They took my suggestion. In the process of doing the transfer, however, they never recorded chain of custody of the ‘B’ bottles leaving storage and being transferred. They simply started the chain of custody as if the transferred bottles were the originals.”

### ***Lifting Rings—The Mickey Mouse Ears***

The IsoPrime has a permanent 21-kilogram magnet and a 45-kilogram electromagnet. The proper functioning of these magnets is critical to the accuracy of the instrument. IsoPrime parts are precision manufactured to within 0.000005 meters (0.005 millimeters).

The instrument, sometimes installed via crane or fork lift, may have lifting rings attached. These large rings are attached with M-15 (about 5/8<sup>th</sup> inch) threaded bolts.

To work properly, these installation rings must be removed prior to running the machine.

When our experts Paul Scott and Simon Davis saw the instrument, they were astonished to find that the instrument had never been properly set up. The lifting rings were still attached.

Simon took a picture on his mobile phone. (See Figure 168.)

#### **Arnie's comment:**

Consider how a compass does not work when a large iron object is placed near it, interfering with its pointing to North.

Retesting was performed on this, the laboratory's IsoPrime2 machine. Although Stage 17 testing was performed on the laboratory's IsoPrime1 machine, this set-up error casts doubt on the entire analytic practice of the laboratory.

It is astonishing that the technicians who set up this machine, the laboratory personnel who operated it over the last years, the ISO accreditors who certified the laboratory, and every other observer until now, failed to correct this error.

#### **Simon Davis's comment:**

***Every test ever conducted at the LNDD on this instrument is suspect.***



**Figure 168. The IRMS IsoPrime2 machine at LNDD April, 2007.<sup>347</sup> IsoPrime lifting rings have never been removed from the instrument after installation. These rings may distort readings. Every test conducted at LNDD on this instrument is suspect.**

### **USADA Expert Brenna Makes Things Worse**

Brenna testified confidently that there was data in the document packet that showed the lifting rings had no effect on the IsoPrime1 instrument. "There are data in the doc packs indicating that the lift rings on the IsoPrime1 didn't have any effect."<sup>348</sup>

Brenna testified that he did not know what effect the lifting rings had on the IsoPrime2 instrument.

LNDD did not have lifting rings on the IsoPrime1.

Landis has never argued that LNDD improperly left the lifting rings on the IsoPrime1. Landis's argument has always been that the lifting rings were on IsoPrime2.

For more on Brenna's false and contradictory statements, see page 376.

<sup>347</sup> Mobile phone image by Simon Davis. April 2007.

<sup>348</sup> CAS official arbitration transcript, p. 1087, lines 13-15.

### ***General Lab Technique***

Landis's observers found gross failures in basic laboratory technique.

For example:

- Cross contamination in pipetting. Pipetting technique was poor. The same pipette was inserted in and out of different solutions.
- Poor glove technique. The operators had little regard for sterile technique. They did not change gloves when technique was broken. For example, Paul asked about reusing a pipette. The operator, gloved, reaching into trash to find a previously used pipette, and then never changed her gloves.

### ***Clear Error in Specific Gravity***

Specific gravity and pH measurements were performed without our observers present.

The sample from Stage 20 pH, reported as *1.018*, in inconsistent with the measurement recorded in the 'A' sample of *1.026*.

Either the sample is not the same, it has been adulterated, or a mistake in measurement occurred.

### ***No Positive Controls***

As in the Stage 17 analysis, no positive control was present in the analysis.

Read more about the need for positive controls on page 127.

### ***Linearity***

Although initially promised that linearity runs, to check the accuracy of the machine over a range of signal strengths, would be conducted before each analysis, and in full view of observers, this agreement was broken.

As discussed under the Stage 17 IRMS analysis on page 228, good linearity is necessary for any accurate IRMS analysis.

Landis's expert observer Simon Davis has the impression that there was a linearity problem with the machine. Although he was not allowed to observe the process, times gaps in linearity testing suggested that the laboratory ran and reran analysis until it obtained a reportable conforming result.

### \*\*\*7E. Bad Chromatography Characterizes Retesting

#### ISL Violation<sup>349</sup>

ISL 5.4.4.2.1:<sup>350</sup>

“Matrix interferences. The method should avoid interference in the detection of Prohibited Substances or their Metabolites or Markers by components of the sample matrix.”

As discussed throughout this book, good chromatography is essential for accurate analysis.

Good chromatography includes well-separated peaks, a lack of matrix inference, and level baselines.

Retesting was characterized by uniformly normal delta values for all of Landis’s analytes, with the exception of occasional abnormal delta values that occur in the muck and mire of bad LNDD chromatography.

For background information about GC/MS and GC/C-IRMS chromatography, see *Appendix G: Test Procedures and Problems* on page 313.

Relatively good chromatography characterized the three negative controls brought to the laboratory by Rodrigo Aguilera, as well as almost all of the Blu (blank urine, negative controls).

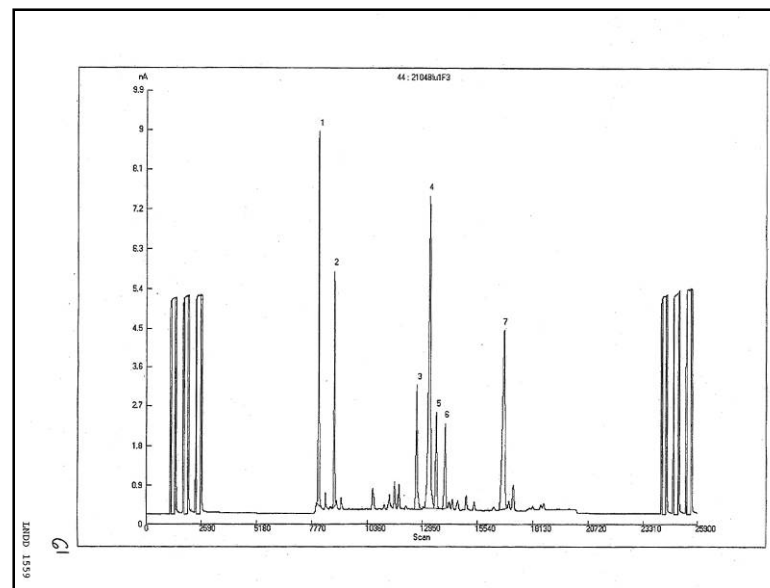
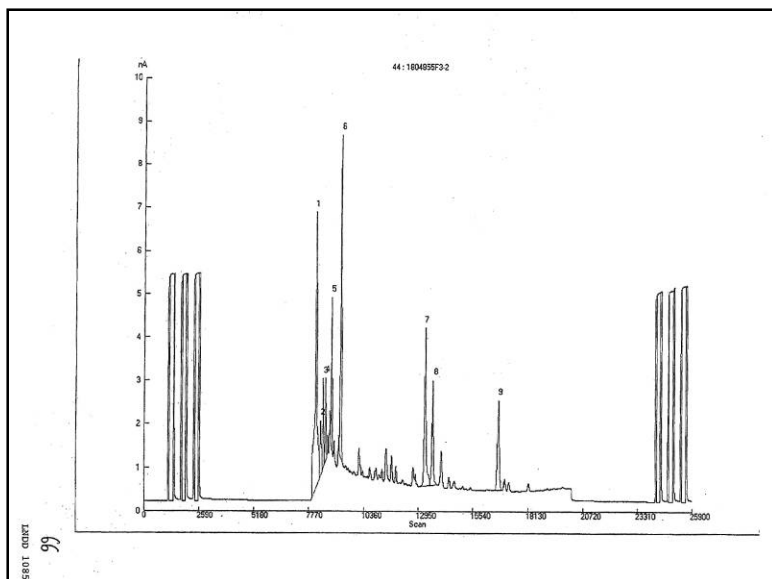


Figure 169. LNDD1559. Blank in 825427. F3 Fraction. Aguilera negative control. 5 $\alpha$ -Adiol = -1.31%. Normal delta values. Stable baseline and good peak separation.

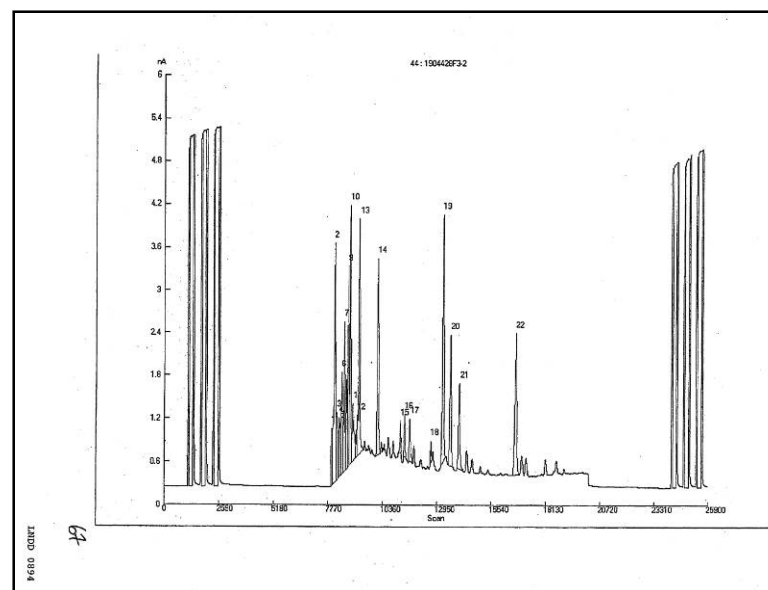
<sup>349</sup> For more on the significance of ISL and other violations, see page 16.

<sup>350</sup> WADA International Standard for Laboratories. 5.4.4.2.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

Shown below are all of the abnormal chromatograms from the retesting of Landis's seven other Tour de France samples, as well as a couple of normal-delta value analyses for comparison.



**Figure 170. LNDD1085. Sample 993855. Stage 11. F3 Fraction. 5 $\alpha$ -Adiol = -4.62‰. 5 $\beta$ -Adiol = -4.09‰. Abnormal delta values. Downsloping baseline. Poor peak separation: peaks 7 and 8 are not well-separated.**



**Figure 171. LNDD0894. Sample 825428. Stage 15. F3 Fraction. 5 $\alpha$ -Adiol = -5.06‰. Abnormal delta value. Downsloping baseline. Poor peak separation. The chromatogram shows an upward sloping baseline drawn at the base of peak 19. For more information about why this is a problem, see page 325.**

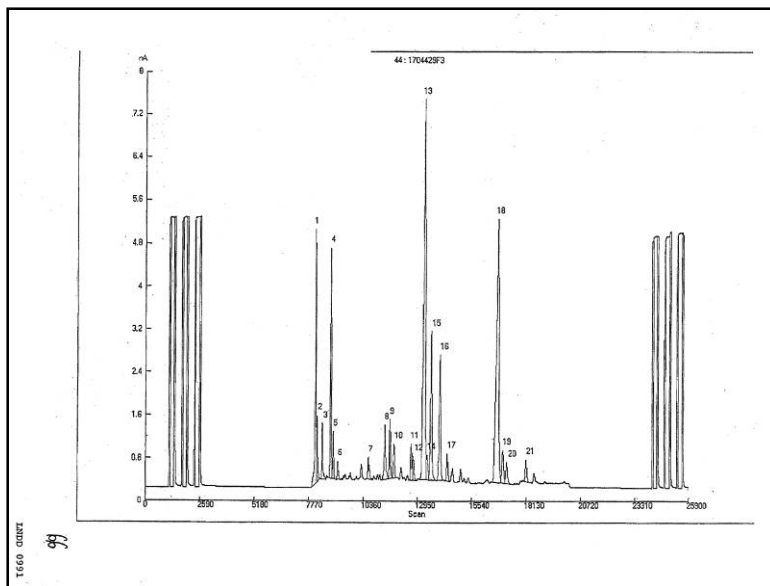


Figure 172. LNDD0991. Sample 825429. Stage 19. F3 Fraction. 5 $\alpha$ -Adiol = -4.80%. Abnormal delta value. Poor peak separation. Peak 14 interferes with peaks 13 and 15.

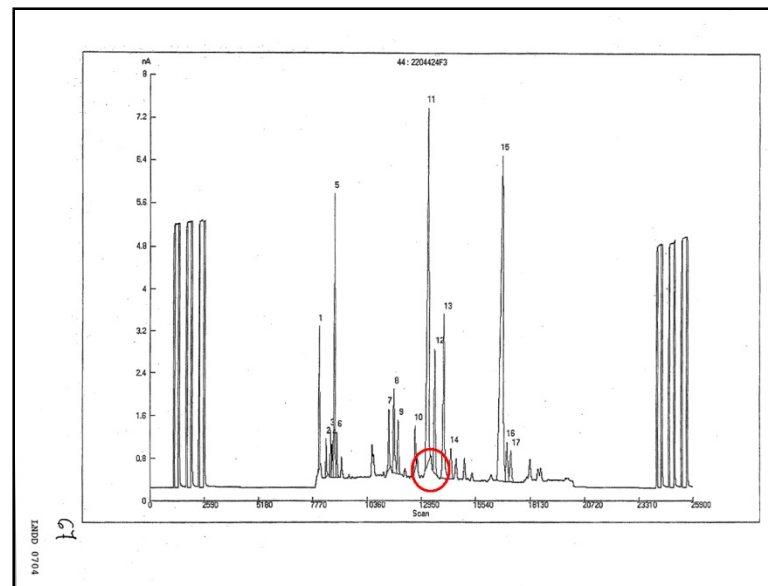


Figure 173. LNDD0704. Sample 825424. Stage 20. F3 Fraction. 5 $\alpha$ -Adiol = -4.96%. Abnormal delta value. Poor peak separation. The chromatogram shows an upward sloping baseline drawn at the base of peak 11 (enlarged in Figure 174).

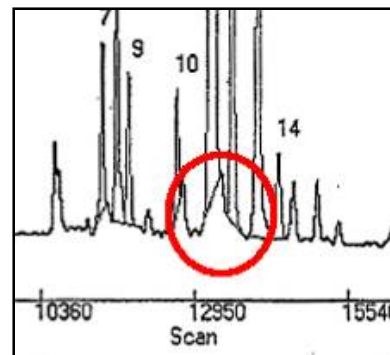
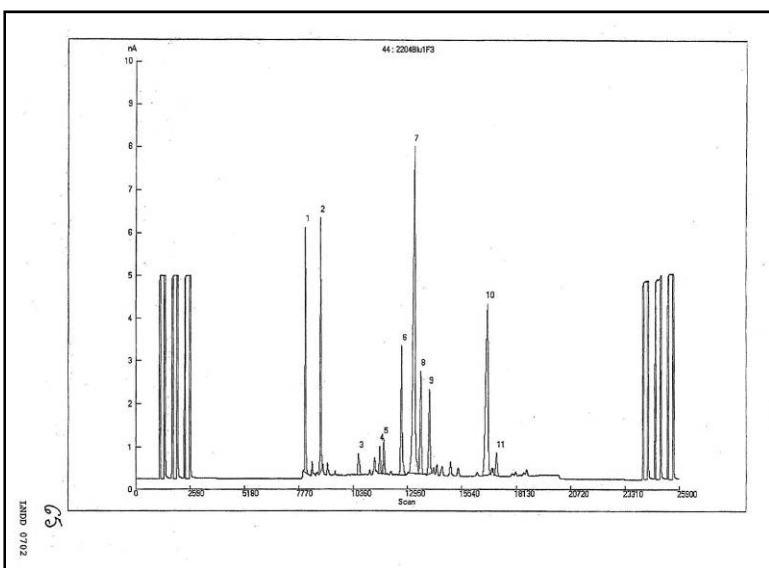


Figure 174. LNDD0704. Sample 825424. Stage 20. An upward sloping baseline manually drawn by the operator at the base of peak 11.



**Figure 175. LNDD0702. Blank 825424. Stage 20. F3 Fraction. Normal delta values. The baseline is flat. The peaks are resolved. The instrument is able to generate a relatively reliable delta value.**



### \*\*\*7F. Time Gaps

Landis's observers saw multiple instances of data processing and reprocessing, with the overwriting of sample files. Pages from the documentation packages allowed us to create tables of time gaps for each day's analysis: See Table 36 through Table 41.

Table 42 on page 257 summarizes these time gaps.

The electronic data files allowed us to associate the time gaps

with specific file overwriting and file deletion. This is discussed and documented starting on page 255.

Some of the time gaps document the operator's inability to reliably and accurately process data.

Other gaps are unexplained and occurred when Landis's observers were denied access.

<i>Sample No. 825429</i>	<i>17.04.2007</i>	<i>Old 994080</i>	<i>Stage 19, July 22, 2006</i>	<i>SG: Old 1.023, New 1.021</i>	<i>LNDD0928</i>
	Aliquot	Start	Time Gap	Bates Stamp	
1	Stabilite 1	11:03		LNDD0996	
2	Stabilite 2	11:14	11 minutes	LNDD0997	
3	Stabilite 3	11:25	11 minutes	LNDD0998	
5	Mix Cal IRMS 005-01	12:18	53 minutes	Not in doc package, from EDF?	
5	Mix Cal IRMS 005-02	12:34	16 minutes	LNDD1001	
6	Mix Cal IRMS 005-03	12:50	16 minutes	LNDD1003	
7	Mix Cal IRMS 005-04	13:05	15 minutes	LNDD1005	
8	Mix Cal Acetate 001-C-1	14:43	1 hour, 38 minutes	LNDD1007	
9	Blu 1 pool 4 F3	18:22	3 hours, 39 minutes	LNDD0990	
10	A 825429F3	19:07	45 minutes	LNDD0992	
11	Blu 1 pool 4 F2	20:25	1 hour, 18 minutes	LNDD0986	
12	A 825429F2	21:10	45 minutes	LNDD0988	
13	Blu 1 pool 4 F1	21:54	44 minutes	LNDD0982	
14	A 825429 F1	22:39	45 minutes	LNDD0984	
15	Mix Cal Acetate 001-C-2	23:24	45 minutes	LNDD1009	
	Overall batch report printed			LNDD0980	

**Table 36. Ten-sample retesting. Unexplained time gaps from April 17, 2007 in red. From document packages and electronic data files.**

*Sample No. 993855    18.04.2007    Old 994277    Stage11, July 13, 2006    SG: Old 1.029, New 1.028    LNDD1022*  
*Sample No. 825423    18.04.2007    Aguilera Control    SG 1.019    LNDD1119*

	Aliquot	Start	Time Gap	Bates Stamp
1	Stabilite 1	9:07		LNDD1090. LNDD1187
2	Stabilite 2	9:18	11 minutes	LNDD1091. LNDD1188
3	Stabilite 3	9:29	11 minutes	LNDD1092. LNDD1189
4	Mix Cal IRMS 005-01	9:50	21 minutes	LNDD1095. LNDD1192
5	Mix Cal IRMS 005-02	10:06	16 minutes	LNDD1097. LNDD1194
6	Mix Cal IRMS 005-03	10:22	16 minutes	LNDD1099. LNDD1196
7	Mix Cal Acetate 001-C-1	10:38	16 minutes	LNDD1101. LNDD1198
7-14	A 993855			
8	Blu 1 pool 4 F3	12:17	1 hour, 39 minutes	LNDD1084
9	A 993855 F3 40 µL #1	13:02	45 minutes	LNDD1111
10	A 993855 F3 30 µL #2 Repeat	13:55	53 minutes	LNDD1086
11	Blu 1 pool 4 F2	14:40	45 minutes	LNDD1080
12	A 825424 F2	15:25	45 minutes	LNDD1082
13	Blu 1 pool 4 F1	16:09	44 minutes	LNDD1076
14	A 825424 F1	16:54	45 minutes	LNDD1078
15-20	A 825423			
15	Blu 2 pool 4 F3	18:29	1 hours, 35 minutes	LNDD1181
16	A 825423 F3	19:30	1 hour, 1 minute	LNDD1183
17	Blu 2 pool 4 F2	20:11	41 minutes	LNDD1177
18	A 825423 F2	20:56	45 minutes	LNDD1179
19	Blu 2 pool 4 F1	21:41	45 minutes	LNDD1173
20	A 825423 F1	22:25	44 minutes	LNDD1175
21	Mix Cal Acetate 001-C-2	23:10	45 minutes	LNDD1103. LNDD1200
	Overall batch reports			LNDD1171. LNDD1074

**Table 37. Ten-sample retesting. Unexplained time gaps from April 18, 2007 in red. From document packages and electronic data files.**

*Sample No. 825426    19.04.2007                      Aguilera Control                      SG 1.017                      LNNDD0735*  
*Sample No. 825428    19.04.2007    Old 994075    Stage 15, July 18, 2006                      SG: Old 1.022, New 1.021                      LNDD0830*

	Aliquot	Start	Time Gap	Bates Stamp
1	Stabilite 1	9:32 AM		LNDD0804. LNDD0899
2	Stabilite 2	9:42 AM	10 minutes	LNDD0805. LNDD0900
3	Stabilite 3	9:53 AM	10 minutes	LNDD0806. LNDD0901
4	Mix Cal IRMS 005-01	10:06 AM	13 minutes	LNDD0809. LNDD0904
5	Mix Cal IRMS 005-02	10:22 AM	16 minutes	LNDD0811. LNDD0906
6	Mix Cal IRMS 005-03	10:38 AM	16 minutes	LNDD0813. LNDD0908
7	Mix Cal Acetate 001-C-1	11:10 AM	32 minutes	LNDD0815. LNDD0910
<b>8-13</b>	<b>A 825426</b>			
8	Blu 1 pool 4 F3	12:30 PM	1 hour, 20 minutes	LNDD0798
9	A 825426 F3	13:17 PM	47 minutes	LNDD0800
10	Blu 1 pool 4 F2	14:03 PM	46 minutes	LNDD0794
11	A 825426 F2	14:47 PM	44 minutes	LNDD0796
12	Blu 1 pool 4 F1	15:40 PM	53 minutes	LNDD0790
13	A 825426 F1	16:24 PM	44 minutes	LNDD0792
<b>14-20</b>	<b>A 825428</b>			
14	Blu 2 pool 4 F3	18:04	1 hours, 40 minutes	LNDD0893
15	A 825428 F3 20 µL #1	18:49	45 minutes	LNDD0920
16	A 825428 F3 15 µL #2 Repeat	19:34	45 minutes	LNDD0895
17	Blu 2 pool 4 F2	20:18	44 minutes	LNDD0889
18	A 825428 F2	21:03	45 minutes	LNDD0891
19	Blu 2 pool 4 F1	21:48	45 minutes	LNDD0885
20	A 825428 F1	22:32	44 minutes	LNDD0887
21	Mix Cal Acetate 001-C-2	23:17	45 minutes	LNDD 0912
	Overall batch report			LNDD0787. LNDD0882

**Table 38. Ten-sample retesting. Unexplained time gaps from April 19, 2007 in red. From document packages and electronic data files.**

<i>Sample No. 993856</i>	<i>20.04.2007</i>	<i>Old 994203</i>	<i>Stage 9, July 11, 2006</i>	<i>SG: Old 1.022, New 1.022</i>	<i>LNDD1307</i>
<i>Sample No. 825425</i>	<i>20.04.2007</i>	<i>Old 994276</i>	<i>Stage 12, July 14, 2006</i>	<i>SG: Old 1.026, New 1.025</i>	<i>LNDD1213</i>

	Aliquot	Start	Time Gap	Bates Stamp
1	Stabilite 1	9:38		LNDD1281. LNDD1375
2	Stabilite 2	9:49	11 minutes	LNDD1282. LNDD1376
3	Stabilite 3	10:00	11 minutes	LNDD1283. LNDD1377
4	Mix Cal IRMS 005-01	10:13	13 minutes	LNDD1286. LNDD1380
5	Mix Cal IRMS 005-02	10:55	42 minutes	LNDD1288. LNDD1382
6	Mix Cal IRMS 005-03	11:11	16 minutes	LNDD1290. LNDD1384
7	Mix Cal Acetate 001-C-1	12:23	1 hour, 12 minutes	LNDD1292. LNDD1386
8-14	A 993856			
8	Blu 1 pool 4 F3	13:08	45 minutes	LNDD1369
9	A 993856 F3 #1	13:53	45 minutes	LNDD1371
10	A 993856 F3 #2 Repeat	14:37	45 minutes	LNDD1371
11	Blu 1 pool 4 F2	15:22	45 minutes	LNDD1365
12	A 993856 F2	16:07	45 minutes	LNDD1367
13	Blu 1 pool 4 F1	16:51	44 minutes	LNDD1361
14	A 993856 F1	17:36		LNDD1363
15-20	A 825425			
15	Blu 2 pool 4 F3	18:21	45 minutes	LNDD1275
16	A 825425 F3	19:06	45 minutes	LNDD1277
17	Blu 2 pool 4 F2	19:51	45 minutes	LNDD1271
18	A 825425 F2	20:36	45 minutes	LNDD1273
19	Blu 2 pool 4 F1	21:20	44 minutes	LNDD1267
20	A 825425 F1	22:05	45 minutes	LNDD1269
21	Mix Cal Acetate 001-C-2	22:50	45 minutes	LNDD1294
	Overall batch report			LNDD1265. LNDD1359

**Table 39. Ten-sample retesting. Unexplained time gaps from April 20, 2007 in red. From document packages and electronic data files.**

*Sample No. 825427    21.04.2007                      Aguilera Control                      SG 1.018                      LNDD1498*  
*Sample No. 993865    21.04.2007    Old 995462    July 23, 2006, Stage 20                      SG: Old 1.025, New 1.025                      LNDD1404*

	<b>Aliquot</b>	<b>Start</b>	<b>Time Gap</b>	<b>Bates Stamp</b>
1	Stabilite 1	8:48		LNDD1472. LNDD1566
2	Stabilite 2	8:59	11 minutes	LNDD1473. LNDD1567
3	Stabilite 3	9:10	11 minutes	LNDD1474. LNDD1568
4	Mix Cal IRMS 005-01	10:17	1 hour, 7 minutes	LNDD1477. LNDD1571
5	Mix Cal IRMS 005-02	10:33	16 minutes	LNDD1479. LNDD1573
6	Mix Cal IRMS 005-03	10:48	15 minutes	LNDD1481. LNDD1575
7	Mix Cal Acetate 001-C-1	11:08	20 minutes	LNDD1483. LNDD1577
<b>8-13</b>	<b>A 825427</b>			
8	Blu 1 pool 4 F3	12:13	1 hour, 5 minutes	LNDD1560
9	A 825427 F3	12:58	45 minutes	LNDD1562
10	Blu 1 pool 4 F2	13:42	44 minutes	LNDD1556
11	A 825427 F2	14:27	45 minutes	LNDD1558
12	Blu 1 pool 4 F1	15:50	1 hour, 23 minutes	LNDD1552
13	A 825427 F1	16:34	44 minutes	LNDD1554
<b>14-19</b>	<b>A 993865</b>			
14	Blu 2 pool 4 F3	18:07	1 hours, 33 minutes	LNDD1466
15	A 993865 F3	18:52	45 minutes	LNDD1468
16	Blu 2 pool 4 F2	19:37	45 minutes	LNDD1462
17	A 993865 F2	20:21	44 minutes	LNDD1464
18	Blu 2 pool 4 F1	21:06	45 minutes	LNDD1458
19	A 993865 F1	21:51	45 minutes	LNDD1460
20	Mix Cal Acetate 001-C-2	22:35	44 minutes	LNDD1485. LNDD1579
	Overall batch report			LNDD1456. LNDD1550

**Table 40. Ten-sample retesting. Unexplained time gaps from April 21, 2007 in red. From document packages and electronic data files.**

Sample No. 825424 22.04.2007

Old 994171 July 23, 2006, Stage 20

SG: Old 1.026, New 1.018

LNDD1498

	Aliquot	Start	Time Gap	Bates Stamp
1	Stabilite 1	11:48 AM		LNDD0709
2	Stabilite 2	11:58 AM	10 minutes	LNDD0710
3	Stabilite 3	12:09 PM	11 minutes	LNDD0711
4	Mix Cal IRMS 005-01	12:22 PM	13 minutes	LNDD0714
5	Mix Cal IRMS 005-02	12:38 PM	16 minutes	LNDD0716
6	Mix Cal IRMS 005-03	12:53 PM	15 minutes	LNDD0718
7	Mix Cal Acetate 001-C-1	13:58 PM	1 hour, 5 minutes	LNDD0720
8	Blu 1 pool 4 F3	14:43 PM	45 minutes	LNDD0703
9	A 825424 F3	15:26 PM	43 minutes	LNDD0705
10	Blu 1 pool 4 F2	16:14 PM	48 minutes	LNDD0699
11	A 825424 F2	16:59 PM	45 minutes	LNDD0701
12	Blu 1 pool 4 F1	17:44 PM	45 minutes	LNDD0695
13	A 825424 F1	18:29 PM	45 minutes	LNDD0697
14	Mix Cal Acetate 001-C-2	19:13 PM	44 minutes	LNDD0722
	Overall batch report			LNDD0693

Table 41. Ten-sample retesting. Unexplained time gaps from April 22, 2007 in red. From document packages and electronic data files.

### \*\*\*7G. Deleted Log Files

#### ISL Violation<sup>351</sup>

##### ISL 5.2.6.1:<sup>352</sup>

“The Laboratory must have documented procedures to ensure that it maintains a coordinated record related to each Sample analyzed. In the case of an Adverse Analytical Finding, the record must include the data necessary to support the conclusions reported (as set forth in the Technical Document, Laboratory Documentation Packages). In general, the record should be such that in the absence of the analyst, another competent analyst could evaluate what tests had been performed and interpret the data.”

##### ISL 5.4.4.1.4:<sup>353</sup>

“All data entry, recording of reporting processes and all changes to reported data shall be recorded with an audit trail. This shall include the date and time, the information that was changed, and the individual performing the task.”

As noted above, the records show time gaps.

The log file documents processing of aliquots and the saving and deletion of data.

Testimony of the operators indicates that they were unaware of the existence of these log files.

The log files from Stage 17 processing were deleted from the hard drive and not saved for review. However, log file data from the retesting was retrieved.

As shown in Table 42 below, some, but not all of the time gaps are explained by the overwriting and deletion of electronic data files.

This data revealed numerous instances of processing, saving, and deletion of data—without documentation as to the reasons for such action.

Files saved under the same name overwrite previous files with that name.

Such file erasures are problematic. These erasures could easily have been avoided by saving data with a new name.

At the AAA and CAS hearings, the operators admitted to overwriting and deleting data. The also admit they have no record or notes as to why the data was erased.

For example, Frelat at the AAA hearing:<sup>354</sup>

AAA Hearing Transcript Page 589  
8                                   And of course, when the cal mix  
9                                   acetate was rerun and saved to the same file  
10                                  name, the first file -- the data of the first  
11                                  file is deleted and no longer part of the  
12                                  record, correct?  
13                                  A.    Yes.  
14                                  Q.    And why did you run mix cal acetate  
15                                  again here?  
16                                  A.    Because the first mix cal acetate  
17                                  was undoubtedly not correct.  
18                                  Q.    And did you take any contemporaneous  
19                                  notes of the first mix cal acetate being not  
20                                  correct?  
21                                  A.    No.  
22                                  Q.    So the record of the first mix cal  
23                                  acetate that was not correct no longer exists,  
24                                  right?  
25                                  A.    No.

AAA Hearing Transcript 590  
1                                  Q.    And you remember that the first mix  
2                                  cal acetate was not correct from your memory  
3                                  alone, right?  
4                                  A.    If I did a second mix cal acetate,  
5                                  it's because -- it was because the first one was  
6                                  not correct.

<sup>351</sup> For more on the significance of ISL and other violations, see page 16.

<sup>352</sup> WADA International Standard for Laboratories. 5.2.6.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>353</sup> WADA International Standard for Laboratories. 5.4.4.1.4. (2004).

<sup>354</sup> The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.



Now, Frelat at the CAS hearing:<sup>355</sup>

CAS Hearing Transcript

Page 876

1 CLAUDE FRELAT - DIRECT  
20 Q. Now for the benefit of the  
21 panel, what occurs when a stability  
22 file or the data related to the  
23 stability 1 raw file is saved with the  
24 same name? What happens to the - what  
25 happens to the underlying data?

CAS Hearing Transcript

Page 877

1 CLAUDE FRELAT - DIRECT  
2 A. I'm going to answer with an  
3 English word. They are overwritten.  
4 Q. And when they are  
5 overwritten does that mean that the  
6 data associated with them is lost?  
7 A. So the data involved here  
8 you have to know that stability process  
9 takes 10 minutes and you can see the  
10 first time, you can see on the first  
11 line, on the first stability line that  
12 it's 8:45 and 36 seconds and on the  
13 second one that it's 8:48 and 14  
14 seconds. I had explained in my earlier  
15 hearing that on April 21st, 2007 it was  
16 the fifth day of the reanalyses with  
17 witnesses and unfortunately I forgot to  
18 do the centering -- the peak center  
19 before doing the stability at 8:45.  
20 Q. And what about the second  
21 one that you had to redo, the last one?  
22 A. I forgot to close -- I  
23 forgot to close the RG valve which is  
24 the reference gas valve.  
25 Q. And this is what you

CAS Hearing Transcript

Page 878

1 CLAUDE FRELAT - DIRECT  
2 remember, this is just your memory of  
3 what occurred, is it?  
4 A. Yes.  
5 MR. SUH: Let's go down to  
6 the line at 9:40:44, Todd. You're

7 actually going to have to go to the  
8 next page to do this, to get the rest  
9 of these if you would, go down to line  
10 44 which is the Mix Cal IRMS 01 raw,  
11 and then go always to the next page  
12 which is GDC 1070 and pick up the top  
13 line, Mix Cal IRMS 02 raw, nine lines  
14 down, Mix Cal IRMS 03 raw. Todd, you  
15 might be able to see them now. They're  
16 the longest file names that end in 02  
17 raw, 03 raw, 01 raw, 02 raw, 03 raw.  
18 If you could highlight all of those do  
19 you see that there's a sequence, Mix  
20 Cal IRMS 1, 2, 3, that's the first run  
21 of Mix Cal, after those first three,  
22 there's another run of Mix Cal IRMS  
23 with the file name.  
24 Q. When you see that does it  
25 mean the first three were overwritten

CAS Hearing Transcript

Page 879

1 CLAUDE FRELAT - DIRECT  
2 and the files and the data associated  
3 with them are gone.  
4 A. Yes, the Mix Cal IRMS were  
5 indeed overwritten.

Simon Davis's comment:

With the OS2 software application, you can change the peak integration without any record of what you have done, or that a change has taken place. You can essentially make the system give you any number you want, and no one would be any the wiser.

<sup>355</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

Date	Time	Explanation of Gap
April 17, 2007	11:42	MixCalIRMS1
	11:49	MixCalIRMS1
	12:06	MixCalIRMS2
	13:21	MixCalAcetate1
	15:26	Reprocess 1-8
	15:46	2 <sup>nd</sup> Reprocess 1-8
April 18, 2007	20:24	1704Blu1F2
	9:40	Unexplained Delay – 10 min
	11:22	Unexplained Delay – 55 min
	13:45	Unexplained Delay – 10 min
	17:39	Unexplained Delay – 50 min
	19:14	Unexplained Delay – 16 min
April 19, 2007	10:54	Unexplained Delay – 16 min
	11:55	Unexplained Delay – 35 min
	15:31	Unexplained Delay – 9 min
	17:09	Unexplained Delay – 55 min
April 20, 2007	10:29	Unexplained Delay – 26 min
	11:26	MixCalAcetate1
	12:11	Unexplained Delay
April 21, 2007	8:45	Stabilite1
	8:47	Stabilite1
	9:25	MixCalIRMS1
	9:41	MixCalIRMS2
	9:56	MixCalIRMS3
	11:53	Unexplained Delay – 20 min
April 22, 2007	15:12	Unexplained Delay – 38 min
	17:19	Unexplained Delay – 48 min
	13:09	MixCalAcetate1
	13:55	MixCalAcetate1 - Stopped Early

Table 42. Ten-sample retesting. Some, but not all, of the time gaps are explained by the overwriting and deletion of electronic data files.

GDC1056. GDC1057. GDC1057. GDC1058.

Data from the April 17, 2007 retesting was deleted.



Figure 176. Processing on April 17, 2007, shows that files were overwritten and thereby deleted.

### GDC1069. GDC1069. GDC1070.

Data from the April 21, 2007 retesting was deleted.



Figure 177. Processing on April 21, 2007, shows that files were overwritten and thereby deleted.

### GDC1073.

Data from the April 22, 2007 retesting was deleted.

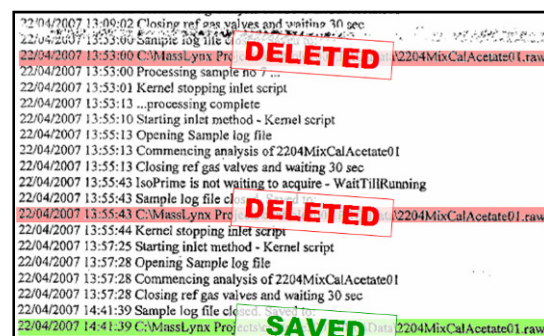


Figure 178. Processing on April 22, 2007, shows that files were overwritten and thereby deleted.

**\*\*\*7H. Inability to Accurately Determine SI Internal Reference Standard (SI) Out of Range**

The laboratory attests that in determining its overall measurement uncertainty, it can identify any given metabolite to within 0.5‰.

USADA's pretrial response brief, at point 38, bases a single metabolite uncertainty of 0.5‰ on measurements of a historical IRMS mix. LNDD doubles the standard deviation to determine uncertainty.

The inability of the laboratory to measure its own internal standard accurately in Stage 17 is discussed on page 201.

*In that discussion, we noted: Considering its inability to process urine adequately for accurate chromatography, it is not surprising, and it is evident, that the laboratory is unable to consistently quantify its own reference standard in urine.*

The retesting of Landis's seven 'B' 2006 Tour samples redemonstrates that LNDD cannot measure its own internal standard to 0.5‰ accuracy.

LNDD's stated acceptable range is 29.96‰ to -30.96‰.

The LNDD laboratory's is repeatedly unable to accurately measure its internal standard in Landis's samples and in blank (negative control) urine.

***LNDD failed to accurately measure the isotopic value of its internal standard 70% of the time.***

		993865	993856	993855	825425	825428	825429	825424	825426*	825423*	825427*
LNDD Bates Reference		1487	1390	1105	1296	914	1011	724	819	1202	1581
Sample	F3	-31.03	-30.74	-30.66	-30.39	-31.01	-30.45	-30.73	-30.69	-30.67	-30.47
	F2	-30.69	-30.51	-30.29	-30.64	-30.49	-30.38	-30.55	-30.51	-30.61	-30.62
	F1	-30.42	-31.38	-30.72	-31.32	-31.08	-31.57	-32.13	-30.75	-30.69	-30.82
Blu	F3	-30.83	-30.84	-30.75	-30.45	-30.87	-30.69	-30.54	-30.62	-30.73	-30.68
	F2	-30.44	-30.67	-30.48	-30.40	-30.22	-30.24	-30.49	-30.58	-30.38	-30.42
	F1	-30.97	-30.82	-30.76	-30.78	-30.75	-30.65	-30.90	-30.73	-30.76	-30.99
Result		Failure	Failure		Failure	Failure	Failure	Failure			Failure

**Table 43. IRMS internal reference standard. The laboratory consistently demonstrated its *inability* to accurately measure its own internal standard. Measurement uncertainty is higher than stated, and higher than the ISO certified value. \*The last three columns are the "control" samples.**

### \*\*\*7I. QC Negative Fails Accuracy Testing

As discussed, each urine sample is processed into three fractions. The LNDD laboratory analyses a known-negative control urine fraction side-by-side with each athlete sample fraction.

The LNDD *Blu* urines are negative quality controls (QC-Neg).

If the isotopic delta values and delta-delta values measured in the quality control urine fractions do not match their known historical values, something is wrong with the analysis.

Traditionally, the mean plus or minus two standard deviations of values obtained from five or more analyses are used to help assure accuracy in testing.

For example, in a peer-reviewed scientific paper, USADA expert Aguilera stated:

“Beginning with the fifth assay, the standard deviations (SDs) of the  $\delta$ -<sup>13</sup>C values obtained in all previous assays were used to determine if the latest assay was acceptable. If more than one of the four SDs were outside the  $\pm$  2SD limit the assay was repeated.”<sup>356</sup>

and:

“The four delta-delta values for the blanc urine were compared to the expected values for that Blanc Urine pool.”<sup>357</sup>

<sup>356</sup> Aguilera, R., Chapman, T.E., and Catlin, D.H. A rapid screening assay for measuring urinary androsterone and etiocholanolone <sup>13</sup>C (0/00) values by gas chromatography/combustion/isotope ratio mass spectrometry. Rapid Commun. Mass Spectrom. 14. p. 2296. (2000). USADA0782.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>357</sup> Aguilera, R., Chapman, T.E., Starcevic, B., Hatton, C.K., and Catlin, D.H. Performance characteristics of a carbon isotope ratio method for detecting doping with testosterone based on urine diols: controls and athletes with elevated testosterone/epitestosterone ratios. Clin. Chem. 47: p. 294. (2001). Also USADA Brief at page 25.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

What happens if we apply Aguilera’s method to the retesting?

***By Aguilera’s standard, as shown in Table 45, at least seven of the ten ‘B’ samples have to be excluded and also the ‘A’ sample IRMS result of sample 995474.***

Here are the details:

#### ***The Historical Data***

##### **LNDD0308 to LNDD0311.**

On LNDD0308 to LNDD0311 are the “Initial IRMS delta values and back-up data for A, E, 5  $\alpha$  -Androstanediol, 5  $\beta$  -Androstanediol used as negative control urine” as well as a list of values obtained between June and August, 2006 for Blu Pool 4.

LNDD reports the means and standard deviation for the differences of Etio – 11-Ketoetio, Andro – 11-Ketoetio, 5 $\beta$ -Adiol – Pdiol and 5 $\alpha$ -Adiol – Pdiol. Table 44 displays these values along with the 2 standard deviation limits.

	<b>Etio– 11-Keto</b>	<b>Andro– 11-Keto</b>	<b>5<math>\beta</math>-diol– Pdiol</b>	<b>5<math>\alpha</math>-diol– Pdiol</b>
<b>Mean</b>	-1.03	-0.21	-0.73	-1.7
<b>SD</b>	0.39	0.31	0.21	0.24
<b>Mean + 2SD</b>	-0.25	0.41	-0.31	-1.22
<b>Mean –2SD</b>	-1.81	-0.83	-1.15	-2.18

**Table 44. Delta-delta differences of Blu Pool 4 based on measured values  $\pm$  two standard deviations.**

### ***The Retesting Data***

Values obtained in the retesting are shown in Table 45.

The values for the control urine fail in seven out of ten samples.

Arnie's comment:

Q. If the LNDD laboratory cannot accurately measure the isotopic delta-delta values of control urine accurately, what confidence can we have that the laboratory can measure athletes' urine accurately?

A: None.

	Acceptable Range	993865	993856	993855	825425	825428	825429	825424	825426	825423	825427
<b>LNDD Bates Stamp</b>		1488	1391	1106	1297	915	1011	726	820	1203	1582
<b>Etio — 11-K-Etio</b>	-1.81 to -0.25	-1,05	-0,81	-0,69	-0,82	-0,76	-0,88	-0,75	-0,87	-0,8	-0,76
<b>Andro – 11K-Etio</b>	-0.83 to 0.41	-0,21	0,08	0,18	0,09	0,11	-0,04	0,13	0,01	0,11	0,21
<b>5<math>\beta</math>-Adiol – Pdiol</b>	-1.15 to -0.31	-0,36	-0,5	-0,42	-0,55	-0,56	-0,36	-0,35	-0,42	-0,58	-0,48
<b>5<math>\alpha</math>-Adiol – Pdiol</b>	-2.18 to -1.22	-1,1	-1,19	-1,11	-1,29	-1,1	-1,08	-1,32	-1,13	-1,06	-1,39
<b>Result</b>		Failure	Failure	Failure		Failure	Failure		Failure	Failure	

**Table 45. Quality control negative urines (Blu Pool 4) for the 5-alpha Androstanediol minus Pregnanediol delta/delta value fall outside the expected range in 7 out of 10 samples used in the retesting process. Why is LNDD failing to measure known control urines accurately?**

## \*7J. Landis's Samples Different Than "Controls"

### *Specific Gravity and Urine Volume Unblinds Samples*

Biases, well-known throughout science, are conscious and subconscious. In good science, samples are blinded. The analyst does not know the true value or origin of the sample, and so is more likely to give an unbiased report.

This principle is also the basis of anonymity in anti-doping control testing.

In Landis's case, the laboratory knew it was going to be analyzing Landis's samples. It had an interest in verifying its previous results.

Best practices also require that samples come from similar populations.

In this case, Dr. Aguilera told our observers that the "control" urines he brought with him came from the pooled urine of UCLA laboratory workers.

As such, they were not comparable to Landis's; they did not come from a similar population.

Landis's urine was 9-month old urine, from an athlete who had competed for many hours. The urine of exercising athletes is different from the urine of sedentary controls. For example, exercise is known to be associated with protein and red blood cells leaking into the urine. Aerobic endurance athletes have a more complex, or difficult-to-examine, urine.

All "controls" had the same urine volume of 35 mL.

Landis's urine differed in other respects. For example, it was concentrated. Well-hydrated sedentary laboratory workers would be expected to have less concentrated urine.

The specific gravity test is a test of urine concentration.<sup>358</sup>

<sup>358</sup> Typical values range from 1.005 (low concentration) to 1.030 (high concentration). For simplicity, consider that urine with a specific gravity between 1.015 and 1.020 is of average concentration and that urine with a specific gravity over 1.020 is concentrated.

At the outset of each sample examination, a specific gravity and pH test is performed. As Table 46 shows, it is obvious that Landis's urine is different from "control" urine.

Ranking urine by concentration, all "control" urines have an average concentration.

Ranking urine by concentration, all Landis's urine is concentrated—with the exception of sample 825424 that has a problem—because the 'A' sample measured specific gravity differs from the retesting measurement by an unexplained amount, an amount much greater than the allowable measurement error.

*At the outset of each sample examination, it is apparent whether one is examining Landis's urine or a "control" urine.*

Sample Number	'A' Sample Specific Gravity	Retesting Specific Gravity	Concentrated?	Volume	ID
993865	1.025	1.025	Yes	25	Landis
993856	1.022	1.022	Yes	35	Landis
993855	1.029	1.028	Yes	40	Landis
825425	1.026	1.025	Yes	30	Landis
825428	1.022	1.021	Yes	20	Landis
825429	1.023	1.021	Yes	40	Landis
825424	1.026	1.018	Lab error	15	Landis
825426	-	1.017	No	35	"Control"
825423	-	1.019	No	35	"Control"
825427	-	1.016	No	35	"Control"

**Table 46. Landis's urine samples are different from so-called "control" urine samples. Blinding is a sham. See discussion for details.**



## 8. Due Process Issues

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### Introduction

The early release of an adverse analytical finding argues against the fairness of the system.

Public statements by WADA or other cycling officials pronouncing a doping violation in advance of the ruling argues against the fairness of the system.

Secrecy of methods or findings argues against the fairness of the system.

Misdirection and lies by USADA undermine justice.

Several published articles document process problems.<sup>359, 360</sup> In particular, the process at the laboratory that tested Landis's sample has been questioned.<sup>361</sup>

### 8A. The WADA System

From Pulitzer-prize winner Michael A. Hiltzik, LA Times, December 10, 2006:<sup>362</sup>

“Anti-doping authorities serve as prosecutor, judge and jury. The innocent often pay a high price.”

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<sup>359</sup> Cowan D and Kicman A. Doping in Sport: Misuse, Analytical Tests, and Legal Aspects. *Clinical Chemistry* 43:1110-1113, (1997). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 9, 2006. Last paragraph especially relevant to transparency issues.

<sup>360</sup> Rushall BS, and Joins, M. The Anti-Drugs-in-Sport Movement: Causes for concern. *International Journal of Sports Science & Coaching*. 1:1-18, (2006). [http://www.multi-science.co.uk/sports\\_science\\_1-1.pdf#search=%22%22Anti-Drugs-in-Sport%20Movement%3A%20Causes%20for%20concern.%22%22](http://www.multi-science.co.uk/sports_science_1-1.pdf#search=%22%22Anti-Drugs-in-Sport%20Movement%3A%20Causes%20for%20concern.%22%22). Accessed Dec 9, 2006.

<sup>361</sup> Vrijman EN. Report. Independent Investigation. Analysis Samples from the 1999 Tour de France. May, 2006. <http://www.cyclingnews.com/news/2006/jun06/vrijmanreport.pdf>. Accessed Dec 9, 2006.

<sup>362</sup> Hiltzik, M. *Presumed Guilty: Athletes' unbeatable foe*. The Los Angeles Times. <http://www.latimes.com/news/nationworld/nation/la-sp-doping10dec10.0.1444445.story?page=1&coll=la-home-headlines>. Accessed Dec 9, 2006.

“Holding contracts not only with WADA but with the National Collegiate Athletic Assn. and the National Football League, the UCLA laboratory performs nearly four times as many blood and urine tests as the global runner-up, in Cologne, Germany. Its work is commonly considered the gold standard of sports doping science.

For all his expertise, however, **Catlin is forbidden by WADA rules from testifying in defense of an athlete in a doping case. He and the lab's more than 40 employees are prevented by WADA rules from engaging in “testing or expert testimony that would call into question ... the scientific validity of work performed in the anti-doping program.”**

Despite WADA's claims of “public transparency and accountability,” it operates largely as a hermetically sealed scientific community with minimal public oversight.

WADA pays labs, usually one of those in its network, to develop tests for banned substances. It then is the sole arbiter of the test's scientific validity.

WADA determines threshold levels at which traces of a substance are deemed a violation.

And under WADA rules, the same laboratory that performs a positive test on an ‘A’ sample also must conduct the confirming test on the ‘B’ sample.

“You have a closed system where very few people in the world know what the science is, and the system has a vested interest to make sure its findings are confirmed,” says David L. Black, president and chief executive of Nashville-based Aegis Sciences Corp., a large independent doping laboratory unaffiliated with WADA.

“The lab should just be a fact-gatherer, but the WADA system is designed in a way that the labs are not just objective fact gatherers, but part of the body of prosecution,” Black said.

## 8B. Early Release of Sample Results

Early release of positive results from ‘A,’ ‘B,’ and retesting samples by L’Equipe and others, often before Landis himself knew the results.

Michael Henson’s comment:

Remember that on July 26, Pat McQuaid announced that there was an Adverse Analytical Finding in one of the athletes, ‘A’ samples taken after Stage 17.

As Mr. McQuaid explained, the rider to whom the adverse belonged was the “worst case scenario.” He then justified the UCI’s premature release of this information by stating: “We know that the French laboratory has a close connection with L’Equipe” - France’s leading sports newspaper – “and we did not want this news to come through the press, because we are sure they would have leaked it.”

The acknowledgement of a guaranteed leak at a WADA accredited lab is particularly disconcerting coming from the head of an international governing body of sport.

Labs are not supposed to be able to identify samples, nor should they leak information to news sources.

Athlete confidentiality and proper results management are fundamental principles of ethical scientific testing.

A few days later, on July 31, an unnamed source within the UCI leaked the flawed results of Landis’s IRMS analysis on his ‘A’ sample to the New York Times.

(Disturbingly and despite recognition of the problem, a leak to L’Equipe is a scenario that replayed itself when they reported unsourced information about scientifically unsupported results from the recent retesting.)

Arnie’s comment:

In testimony, laboratory operator Mongongu testified she was not the leak of the ‘A’ sample results. She also testified that this was the first time she was asked about these leaks, that so far as she knew, neither the laboratory director nor anyone else ever questioned her or performed an investigation (see page 402).

Not only the lab, but also McQuaid should have been sanctioned.

In testimony, laboratory operator Frelat, testified in performing the ‘B’ sample IRMS analysis, that she knew the identity of the sample, that it was Landis, because she had read it in the press (see page 388).

## 8C. Media Comments By WADA And Other Officials

### *Example A. Dick Pound*

Dick Pound: “He (Landis) has to find some way to overcome the fact that there is an ‘A’ and ‘B’ sample that is up to its eyeballs in testosterone.”<sup>363</sup>

Arnie’s comment:

Pound is inflammatory.

If anything, he should have been castigating and sanctioning the LNDD for its leaks to the press.

He is also factually wrong. For proof, see page 75.

### *Example B. Pat McQuaid*

By Agence France Presse

This report filed October 28, 2006

“World cycling chief Pat McQuaid has launched a broadside at the handling of a doping investigation which has left the UCI virtually unable to sanction riders suspected of cheating.”

Arnie’s comment:

This report states a fundamental problem.

Although governing bodies might wish otherwise, they should *not* be permitted to sanction riders *suspected* of cheating—only riders *proven* to have cheated.

Would you think it fair to be fined or fired from your job by an employer who merely suspects you of something?

This report quoting McQuaid reminds me of USADA-expert witness and WADA-approved Montreal laboratory director Ayotte’s comment: “When rich athletes and American lawyers fight against the validity of tests and controls, we better be creative!” (See page 372.)<sup>364</sup>

<sup>363</sup> Dick Pound quoted in *After the fall* by Wayne Coffey. New York Daily News, 12-17-2006. [http://www.nydailynews.com/12-17-2006/sports/more\\_sports/story/480743p-404555c.html](http://www.nydailynews.com/12-17-2006/sports/more_sports/story/480743p-404555c.html). Accessed Dec 21, 2006.

<sup>364</sup> Translation from French: “Quand des athlètes et de riches avocats américains se battent contre la validité des tests et des contrôles, on a intérêt à être créatif!” <http://www.jobboom.com/jobmag/2005/v6n6/v6n6-06g.html>. Accessed May 1, 2007. Also, GDC01354.

## 8D. Hiding and Moving the Ball<sup>365</sup>

USADA failed fairness in a number of ways, including refusing to disclose basic information they had from the start.

WADA rules note: “At the athlete request, a full documentation package including data on tests both prior and subsequent to the initial fining should be provided to the athlete.”<sup>366</sup>

USADA refused to share basic information about Floyd’s test results from the seven other Tour de France stages on which analyses were performed. (They were ordered to do so by the arbitrators, about six months into the case.)

This strategy wasted time and money for both USADA and Floyd’s defense.

USADA also shifted responses and testimony as its arguments became untenable. For example, its document production and experts contradicted themselves about:

- The need to account for IRMS measurement uncertainty of 0.8 delta units.
- The role of relative retention time in GC/MS and GC-C-IRMS in the identification of analytes.
- Chain of custody issues.

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<sup>365</sup> “Hiding the ball” is a well-known plaintiff/prosecution/claimant strategy where, early on, the plaintiff realizes that their case is weak. The plaintiff refuses to release documents in discovery that might weaken their case. Consider that in a strong case, aimed at truth-finding, the plaintiff will share their case early and willingly in order to reduce costs. Where the case is weak, the opposite strategy comes into play: increase the complexity (time and money spent) in the hopes that the respondent/defendant will run out of resources. USADA/WADA apparently have multi-million dollar “slush finds,” to cover legal expenses. <http://rant-your-head-off.com/WordPress/?p=521>. Accessed May 20, 2008.

<sup>366</sup> WADA Guideline Reporting and Management of Elevated T/E Ratios. 8. (2006). <http://www.wada-ama.org/rtecontent/document/GuidelineReportingManagementElevatedTERatios.pdf>. Accessed Dec 28, 2006.

## 8E. Lies and Fraud

Records have disappeared and documents appear to have been fabricated.

In direct document production, including its briefs, USADA made disingenuous and outright misstatements of fact. See page 21.

## 8F. Report Documentation

WADA: “In general, the record should be such that in the absence of the analyst, another competent analyst could evaluate what tests had been performed and interpret the data.”<sup>367</sup>

Arnie’s comment:

If Drs. Meier-Augenstein, Davis, Goodman, and Matthews are having trouble interpreting the report, and significant questions remain unanswered, this standard is not being met. See page 396 for USADA expert Matthews difficulty with the internal standard and SOPs.

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<sup>367</sup> WADA International Standard for Laboratories. 22, (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

## 8G. Provision of Document Package

### USADA0002.

The table of contents is inaccurate. For example, the table of contents lists that the positive aliquot is to be found on page 55. The corresponding page 55 (USADA60) is a negative aliquot.

### Summary by USADA of Laboratory Documents.

Misidentifies Type of Collection as Out of Competition.

## 8H. Timing

The 'A' sample IRMS work started *before* the T/E was confirmed.

Remember: The screening T/E had a problem with derivatization and was known to be invalid.

### USADA0012.

IRMS work begun	July 22, 11:20
1 <sup>st</sup> Confirmation result	July 22, 18:02

Arnie's comment:

It is not "normal" to proceed to IRMS before T/E confirmation.

## 8I. ADRB Dismissal Timing

Howard Jacobs made a dismissal request to the USADA Anti-Doping Review Board.<sup>368</sup> It appears from the letter, dated September 15, 2006, that the decision to decline the dismissal request was made *before* the board met on September 18, 2006.<sup>369</sup>

Arnie's comment:

This may mean that the USADA ADRB did not give careful consideration to this matter. It may mean that they gave *no* consideration at all.

## 8J. Scientific Misconduct. LNDD Errors

We have reports of LNDD:

- Issuing false-positive adverse analytical findings due to mixed-up sample numbers and contamination.
- Requesting destruction of previous reports.

These errors appear to meet the criteria for revocation of accreditation.

One contamination issue occurred during the Tour (though related to another sport).

Arnie's comment:

This speaks to the lab's inability to get things right.

These errors are grounds for revocation of the laboratory's accreditation.

<sup>368</sup> Jacobs, H. Dismissal submission to USADA. September 7, 2006.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>369</sup> Dismissal submission denial. September 15, 2006.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

## **8K. Release of Other Athletes' Results**

### **USADA0006.**

This appears to be a listing of three athletes tested on Stage 17.  
Two athletes are not Landis.

### **USADA0007.**

Mid page: It appears that 994178 is positive for ES08B-PS. Poor quality reproduction. This is not Landis.

### **USADA0008.**

Lower right page: It appears that 994178 may be positive for or have some problem with EPO. This is not Landis.

Arnie's comment:

It is wrong to release, in Landis's document package, without redaction, other riders' results.

## Appendix A:

### \*\*\*ISL and Other Violations

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#### WADA Rules, Standards, and Technical Documents

These are the applicable governing rules:

- [WADA World Anti-Doping Code. \(2003\).](#)
- [WADA International Standard for Laboratories \(ISL\). \(2004\).](#)
- [International Organization for Standardization. ISO 17025. \(2005\).](#)
- [WADA Technical Document—TD2003IDCR. 1. \(2003\).](#)  
Identification criteria for qualitative assays incorporating chromatography and mass spectrometry.
- [WADA Technical Document—TD2003LCOC. \(2003\).](#)  
Laboratory internal chain of custody.
- [WADA Technical Document—TD2003LDOC. \(2003\).](#)  
Laboratory documentation packages.
- [WADA Technical Document—TD2004EAAS. \(2004\).](#)  
Reporting and evaluation guidance for testosterone, epitestosterone, T/E ratio and other endogenous steroids.
- [SOP I-N-29. Notice d'Utilisation du Couplage GC/C/IRMS – IsoPrime1. LNDD0541 to LNDD0554.](#)

#### Violations

Violations of the WADA International Standard for Laboratories (ISL), ISO 17025 standard, WADA technical documents (TDs), and LNDD standard operating procedures (SOPs) are found throughout the document package.

*Any* single violation is sufficient to shift the burden of proof back to USADA to show that the violation did not *cause* the adverse analytical finding. Read about burden of proof on page 16

Here is summary of ISL and other violations.

**ISL Violations are ISO Violations *and vice versa*...**  
**ISO Violations are ISL Violations**

*The ISL mandates ISO compliance:*

#### ISL 5.1. Introduction and Scope

“Any aspect of testing or management not specifically discussed in this document shall be governed by ISO/IEC 17025.”

#### ISL 5.4.1. General

“General support shall be provided in accord with ISO/IEC 17025.”

#### ISL 6.2.1 Obtain ISO 17025 Accreditation

“The laboratory shall prepare and establish the required documentation and system according to the requirements in Application of ISO 17025 to Analysis of Doping Control Sample (Section 5) and the ISO 17025.”

*The ISO mandates ISL compliance:*

#### ISO 17025. 5.2. Personnel

##### ISO 5.2.1.

“The laboratory management shall ensure the competence of all who operate specific equipment, perform tests and/or calibrations, evaluate results, and sign test reports and calibration certificates.”

*As such, a qualified person should be fully aware of the WADA ISL and ISO requirements.*

*As such, all ISL and other violations are also ISO violations.*



## **ISL 5.2.2. Handling of Samples**

### **ISL 5.2.2.2**

Discussed in reference to *Chain of Custody* on page 93.

“The Laboratory shall have Laboratory Internal Chain of Custody procedures to maintain control of and accountability for Samples from receipt through final disposition of the Samples. The procedures must incorporate the concepts presented in the WADA Technical Document for Laboratory Internal Chain of Custody.”

***LNDD has failed.***

## **ISL 5.2.4. Testing**

### **ISL 5.2.4.2. Urine Screen Testing**

#### **ISL 5.2.4.2.3**

Discussed in reference to *Lack of Controls* on page 127.

“All screening assays shall include negative and ***positive controls*** in addition to the Samples being tested.” [Emphasis added.]

***LNDD has failed.***

## **ISL 5.2.4 Testing**

### **ISL 5.2.4.3 Urine Confirmation Testing**

#### **ISL 5.2.4.3.2 ‘B’ Sample Confirmation**

##### **ISL 5.2.4.3.2.2**

Discussed in reference to *Same Operator* on page 145.

“A different analyst must perform the ‘B’ analytical procedure. The same individual(s) that performed the ‘A’ analysis may perform instrumental set up and performance checks and verify results.”

#### **ISL 5.2.4. Testing**

##### **ISL 5.2.4.3. Urine Confirmation Testing**

###### **ISL 5.2.4.3.2. 'B' Sample Confirmation**

###### **ISL 5.2.4.3.2.3**

Discussed in reference to *'A' Samples Negative → 'B' Samples Negative* on page 239.

“The ‘B’ Sample result must confirm the ‘A’ Sample identification for the Adverse Analytical Finding to be valid.”

#### **ISL 5.2.4. Testing**

##### **ISL 5.2.4.3. Urine Confirmation Testing**

###### **ISL 5.2.4.3.2. 'B' Sample Confirmation**

###### **ISL 5.2.4.3.2.7**

Discussed in reference to *'A' Samples Negative → 'B' Samples Negative* on page 239.

“If the ‘B’ Sample confirmation does not provide analytical findings that confirm the ‘A’ Sample result, the Sample shall be considered negative and the Testing Authority notified of the new analytical finding.”

*Having already tested the 'A' samples as negative, the only finding allowed by WADA's own rules is that the 'B' samples are also negative.*

#### **ISL 5.2.6. Documentation and Reporting**

##### **ISL 5.2.6.1**

Discussed in general on page 91.

Discussed in reference to *Unexplained Time Gaps* on page 123.

Discussed in reference to *LNDD Performed the IRMS Test Badly* on page 177.

Discussed in reference to *Bad Chromatography* on page 197

Discussed in reference to *Bad Identification: Results Not Reproducible* on page 206.

Discussed in reference to *Deleted Log Files* on page 255.

“The Laboratory must have documented procedures to ensure that it maintains a coordinated record related to each Sample analyzed. In the case of an Adverse Analytical Finding, the record must include the data necessary to support the conclusions reported (as set forth in the Technical Document, Laboratory Documentation Packages). In general, the record should be such that in the absence of the analyst, another competent analyst could evaluate what tests had been performed and interpret the data.”

***LNDD has failed.***

## **ISL 5.4.2. Personnel**

### **ISL 5.4.2.2**

Discussed in reference to *Document Package Riddled with Errors* on page 109.

Discussed in reference to *Lies and Fraud* on page 21.

“All personnel should have thorough knowledge of their responsibilities including the security of the Laboratory, confidentiality of results, Laboratory Internal Chain of Custody protocols, and the standard operating procedures for any method that they perform.”

***LNDD has failed.***

## **ISL 5.4.4. Test Methods and Method Validation**

### **ISL 5.4.4.2. Validation of Methods**

#### **ISL 5.4.4.2.1. Confirmation Methods for Non-Threshold Substances Must be Validated**

Discussed in reference to *Contamination/Degradation* on page 134.  
Discussed in reference to *Bad Identification: Matrix Interference* on page 155.

Discussed in reference to *Bad Identification: Bad Chromatography* on page 197.

Discussed in reference to *Bad Chromatography Characterizes Retesting* on page 245.

“Matrix interferences. The method must avoid (non-threshold) or limit (threshold) interference in the detection of *Prohibited Substances* or their *Metabolites or Markers* by components of the sample matrix.

***The laboratory is in clear violation of the relevant ISL standards.***

#### **ISL 5.4.4.2.1. Confirmation Methods for Non-Threshold Substances Must be Validated**

Discussed in reference to *LNDD Has No Reference Range Population* on page 216.

“Reference standards should be used for identification, if available. If there is no reference standard available, the use of data or sample from a validated Reference Collection is acceptable.”

***LNDD has failed.***

#### **ISL 5.4.4. Test Methods and Test Validation**

##### **ISL 5.4.4.3. Estimate of Uncertainty of Method**

###### **ISL 5.4.4.3.1. Uncertainty in Identification**

Discussed in reference to *Bad Identification: Single Ion* on page 152.

Discussed in reference to *Does LNDD Have Identification Criteria?* on page 180.

“The Laboratory must establish criteria for identification of a compound *at least as strict* as those stated in any relevant Technical Document.”

***LNDD has failed.***

#### **ISL 5.4.4.4. Control of Data**

##### **ISL 5.4.4.4.1. Data and Computer Security**

###### **ISL 5.4.4.4.1.3**

Discussed in reference to *Inadequate Lab Security* on page 149.

“The software shall prevent the changing of results unless there is a system to document the person doing the editing and that editing can be limited to users with proper level of access.”

***LNDD has failed.***

#### **ISL 5.4.4.4.1.4**

Discussed in reference to *Unexplained Time Gaps* on page 123.

Discussed in reference to *Inadequate Lab Security* on page 149.

Discussed in reference to *Deleted Log Files* on page. 255.

“All data entry, recording of reporting processes and all changes to reported data shall be recorded with an audit trail. This shall include the date and time, the information that was changed, and the individual performing the task.”

***LNDD has failed.***

#### **ISL 5.4.7. Assuring the Quality of Test Results**

##### **ISL 5.4.7.3**

Discussed in reference to *Lack of Controls* on page 127.

Discussed in reference to *No Controls in Run* on page 162.

Discussed in reference to *No Positive Controls in Run* on page 222.

“Analytical performance should be monitored by operating quality control schemes appropriate to the type and frequency of testing performed by the Laboratory. The range of quality control activities includes:

- *Positive* and *negative controls* analyzed in the same analytical run as the Presumptive Adverse Analytical Finding Sample.
- The use of deuterated or other internal standards or standard addition.
- Comparison of mass spectra or ion ratios from selected ion monitoring (SIM) to a Reference Material or Reference Collection sample analyzed in the same analytical run
- Confirmation of the ‘A’ and ‘B’ Split Samples.”

***LNDD has failed.***

### **ISO 17025. 4.3.3. Document Changes**

#### **ISO 17025. 4.3.3.3.**

Discussed in reference to *Document Package Riddled with Errors* on page 109.

Discussed in reference to *Wrong Sample Numbers* on page 113.

“If the laboratory’s document control system allows for the amendment of documents by hand pending the re-issue of the documents, the procedures and authorities for such amendments shall be defined. Amendments shall be clearly marked, initialed and dated. A revised document shall be formally re-issued as soon as practicable.”

***LNDD has failed.***

### **ISO 17025. 4.13.2. Technical Records**

#### **ISO 17025. 4.13.2.2.**

Discussed in reference to *Magical Appearances* on page 31.

“Observations, data and calculations shall be recorded at the time they are made and shall be identifiable to the specific task.”

***LNDD has failed.***

### **ISO 17025. 4.13.2. Technical Records**

#### **ISO 17025. 4.13.2.3.**

Discussed in reference to *Document Package Riddled with Errors* on page 109.

Discussed in reference to *Lies and Fraud* on page 21.

“When mistakes occur in records, each mistake shall be crossed out, not erased, made illegible or deleted, and the correct value entered alongside. All such alterations to records shall be signed or initialed by the person making the correction. In the case of records stored electronically, equivalent measures shall be taken to avoid loss or change of original data.”

***LNDD has failed.***

## **ISO 17025. 5.2. Personnel**

### **ISO 5.2.1.**

Discussed in reference to *'A' Samples Negative → 'B' Samples Negative* on page 239.

“The laboratory management shall ensure the competence of all who operate specific equipment, perform tests and/or calibrations, evaluate results, and sign test reports and calibration certificates.”

***As such, a qualified person should be fully aware of the WADA and ISO requirements. As such, all ISL and other violations are also ISO violations.***

For example, in calling a 'B' sample retest of Landis's originally negative samples an adverse analytical finding, laboratory personnel are in violation of:

ISL 5.2.4.3.2.3:

“The 'B' Sample result must confirm the 'A' Sample identification for the Adverse Analytical Finding to be valid.”

ISL 5.2.4.3.2.7:

“If the 'B' Sample confirmation does not provide analytical findings that confirm the 'A' Sample result, the Sample shall be considered negative and the Testing Authority notified of the new analytical finding.”

***This point was made by Panel Arbitrator Campbell in his questioning of Mongongu, as noted on page 403.***

## **ISO 17025. 5.4. Test and Calibration Methods and Method Validation**

### **ISO 17025. 5.4.1. General**

Discussed in reference to *Wrong Columns Used* on page 188.

Discussed in reference to *LNDD Has No IRMS Operating Manual* on page 224.

“The laboratory shall have instructions on the use and operation of all relevant equipment, and on the handling and preparation of items for testing and/or calibration, or both, where the absence of such instructions could jeopardize the results of tests and/or calibrations. All instructions, standards, manuals and reference data relevant to the work of the laboratory shall be kept up to date and shall be made readily available to personnel.”

“Deviation from test and calibration methods shall occur only if the deviation has been documented, technically justified, authorized, and accepted by the customer.”

***LNDD has failed.***

## **ISO 17025. 5.5. Equipment**

### **ISO 17025. 5.5.11.**

Discussed in reference to *Obsolete Hardware and Software* on page 118.

Discussed in reference to *Bad Identification: Results Not Reproducible* on page 206.

“Where calibrations give rise to a set of correction factors, the laboratory shall have procedures to ensure that copies (e.g. in computer software) are correctly updated.”

***The laboratory is in clear violation of the relevant ISO standards.***

## **TD2003IDCR.<sup>370</sup> Page 1.**

Discussed in reference to *Bad Identification: Single Ion* on page 152.

Discussed in reference to *Bad Identification: Wrong Column Used* on page 188.

“The laboratory must establish criteria for the identification of a compound.”

The document describes typical acceptable criteria:

Full scans or single ion monitoring (SIM) is acceptable.

With SIM, the identity and quantification of the T and E peaks must be confirmed by at least two, preferably three diagnostic ions in the mass spectrum. Identification based on retention times alone is inadequate.

***The LNDD has failed to meet the minimum criteria for steroid identification.***

***This failure should end the case in so far as GC/MS for T/E ratio and longitudinal evaluation.***

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<sup>370</sup> WADA TD2003IDCR. 1-2. (2003). Identification criteria for qualitative assays incorporating chromatography and mass spectrometry. [Accessed Dec 28, 2006.](#)



### TD2003IDCR. Page 1

Discussed in reference to *Bad Identification: T/E Peaks Misidentified* on page 159.

Discussed in reference to *Bad Identification: Wrong Column Used* on page 188.

Discussed in reference to *Bad ID: Retention Time Shift: Retesting* on page 186.

Discussed in reference to *Bad ID: Retention Time Shift: 995474* on page 185.

“[T]he retention time of the analyte shall not differ by more than one percent or  $\pm 0.2$  minutes (which ever is smaller) from that of the same substance in a spiked urine sample.”

***Bottom line: The lab got it wrong.***

### TD2003LCOC<sup>371</sup>

Discussed in reference to *Chain of Custody* on page 93.

1. “The entry into the Laboratory Internal Chain of Custody should be completed at the time that any change of possession occurs.”
2. “In the case of Samples, the Laboratory Internal Chain of Custody should record all movement from receipt in that Laboratory through storage and sampling to disposal.”
3. “The Laboratory Internal Chain of Custody shall be a ***continuous*** record of individuals in possession of the samples or Sample Aliquots.” [Emphasis added.]
4. “When not in an individual’s possession, it should be documented that the Sample or Aliquot is within a controlled zone.”

***LNDD has failed.***

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<sup>371</sup> WADA TD2003LCOC. Laboratory Internal Chain of Custody. (2003). [http://www.wada-ama.org/rtecontent/document/chain\\_custody\\_1\\_2.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/chain_custody_1_2.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.

### **TD2003LCOC**

Discussed in reference to *Document Package Riddled with Errors* on page 109.

Discussed in reference to *Lies and Fraud* on page 21.

“Any forensic corrections that need to be made to the comment should be done with a single line through and the change should be initialed and dated by the individual making the change. No white out or erasure that obliterates the original entry is acceptable.”

***LNDD has failed.***

### **TD2003LDOC<sup>372</sup>**

Discussed in reference to *Lack of Controls* on page 127.

Discussed in reference to *No Controls in Run* on page 162.

Discussed in reference to *No Positive Controls in Run* on page 222.

The laboratory document package should contain:

“Confirmation procedure data on ***negative, positive***, and all Athlete aliquots.” [Emphasis added.]

***LNDD has failed.***

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<sup>372</sup> WADA TD2003LDOC. Laboratory Documentation Packages. (2003). [http://www.wada-ama.org/rtecontent/document/lab\\_docs\\_1\\_3.pdf](http://www.wada-ama.org/rtecontent/document/lab_docs_1_3.pdf). Accessed Dec 28, 2006.

### TD2004EAAS.<sup>373</sup> Page 2

Discussed in reference to *Lack of Replicates* on page 132.

Discussed in reference to *Confirmation Not in Triplicate* ('A' sample) on page 169.

"[C]onfirmation of elevated T/E values, concentration of testosterone, epitestosterone... is to be performed in triplicate."

***LNDD has failed.***

### TD2004EAAS. Page 2

Discussed in reference to *Bad Identification: Single Ion* on page 152.

"The confirmation of the identity of any steroid reported with abnormal properties must be made (refer to technical document TDE2003IDCR)."

***LNDD has failed.***

### TD2003EAAS. Page 2

Discussed in reference to *Lack of Controls* on page 127.

Discussed in reference to *No Controls* in Run on page 162.

"Appropriate calibration (e.g. calibration curve, deuterated standards, **quality control** samples) is to be included in the protocol of the confirmation Procedure." [Emphasis added.]

***LNDD has failed.***

### TD2004EAAS. Page 2

Discussed in reference to *Contamination/Degradation* on page. 134.

"The urine Sample is not collected under sterile conditions, and where the circumstances are favourable, the microbes present in the Sample can cause changes to the profile of the urinary steroids. Initially there is cleavage of the glucuronides and sulfates followed by modifications of the steroids' structure by oxido-reductive reactions. To report an Adverse Analytical Finding of an elevated T/E value, testosterone or epitestosterone concentration or any other endogenous steroid parameters, the concentration of free testosterone and/or epitestosterone in the specimen is not to exceed 5% of the respective glucuroconjugates."

***The level of free epitestosterone in Landis's 'B' sample exceeds the 5% threshold.***

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<sup>373</sup> WADA TD2004EAAS. (2004). Reporting and evaluation guidance for testosterone, epitestosterone, T/E ratio and other endogenous steroids. [http://www.wada-ama.org/rtecontent/document/end\\_steroids\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/end_steroids_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.

**SOP I-N-29. 4.2.6.2.**<sup>374</sup>

Discussed in reference to *Poor Linearity* on page 228.

“Ce test est à effectuer au moins une fois par mois.”

[Linearity tests are to be conducted a minimum of once per month.]

***LNDD has failed.***

**SOP M-AN-52.**<sup>375</sup>

Discussed in reference to *Bad Identification: Wrong Column Used* on page 188.

***LNDD has failed.***

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<sup>374</sup> SOP I-N-29. Notice d’Utilisation du Couplage GC/C/IRMS – IsoPrime1. LDD0547.  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>375</sup> SOP M-AN-52. Analyse GC/MS –Confirmation Qualitative des Métabolites de las Testostérone et de ses Précurseurs. LNDD0664.  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

## Appendix B:

### \*\*\*Metabolite Positivity

Testosterone has various metabolites (breakdown products).

Over the years, the testing for the quantity of these products, or formulae including subtractions or ratios of these products, has been used to assess whether exogenous (synthetic) testosterone has been used.

The best test currently available is isotope ratio mass spectrometry (IRMS, more fully called gas chromatography/combustion isotope ratio mass spectrometry—GC/C-IRMS). It is also called carbon isotope testing (CIR).

There are four metabolites commonly studied: 5-alpha-androstanediol (5 $\alpha$ -Adiol), 5-beta-androstanediol (5 $\beta$ -Adiol), androsterone (andro), and etiocholanolone (etio) (see Figure 179).

5-alpha-androstanediol metabolically interconverts with androsterone. 5-beta-androstanediol interconverts with etiocholanolone.

Some studies have looked at 5-alpha-androstanediol and 5-beta-androstanediol. Some studies have looked at androsterone and etiocholanolone.

5-beta-androstanediol has emerged as the most important metabolite.

“Our results suggest that measurements of 5 $\beta$ -androstanediol delta values allow the detection of a testosterone ingestion over a longer period than other T metabolites  $\delta^{13}\text{C}$ -values.” [Maitre 2004](#).

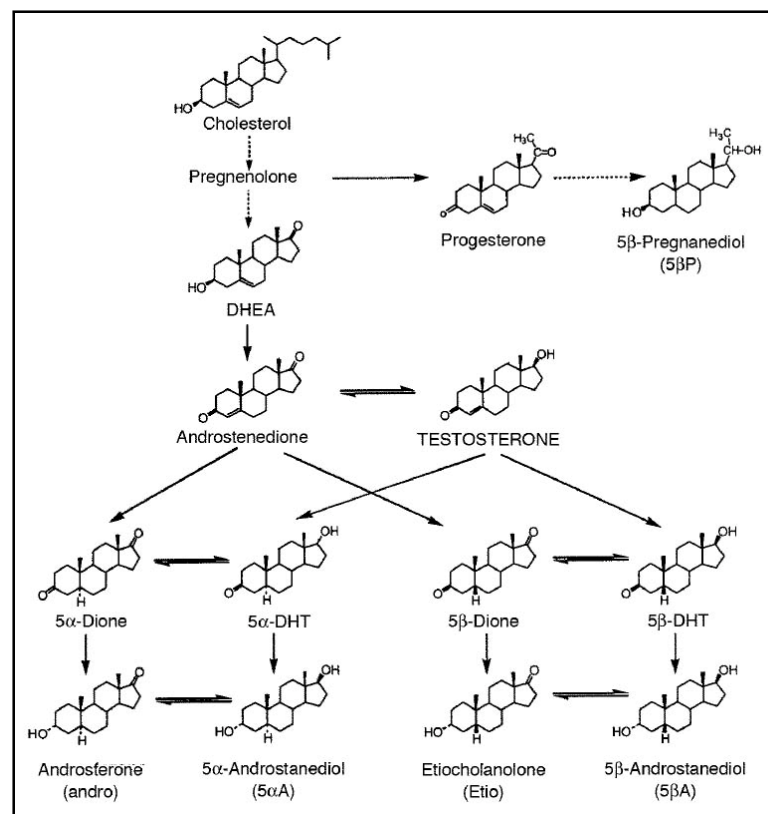


Figure 179. Metabolic pathways of testosterone. From [Maitre](#).

Subtraction Values	Corrected Value	Normal?
Andro – 11-Ketoetio	-3.51‰ ± 0.8‰	Within lab error
5 $\alpha$ -Adiol – 5 $\beta$ -Pdiol	-6.39‰ ± 0.8‰	Abnormal
Etio – 11-Ketoetio	-2.02‰ ± 0.8‰	Normal
5 $\beta$ -Adiol – 5 $\beta$ -Pdiol	-2.65‰ ± 0.8‰	Normal

Table 47. Landis's IRMS metabolite subtraction values.

## Landis and “All Metabolites” Q&A

**Q1.** *Do all IRMS metabolites examined need to be positive to determine a positive test for testosterone or its precursors, or is one sufficient?*

**A1.** In this document, I address mostly scientific issues.

For the important legal issues, see lawyer Howard Jacob’s arguments made in his dismissal motion to the Anti-Doping Review Board (a copy can be found at <http://floydlandis.com/> ).

I have looked at published (1) laboratory guidelines, (2) scientific studies over the last decade, (3) symposia and other reviews, as well as (4) precedents set by the Court of Arbitration for Sport. The scientific studies are summarized in Table 48 on page 285 and page 286.

In many source documents, there are *clear statements that all metabolites examined* must be abnormal to determine that testosterone is of exogenous origin and that a doping offense has occurred.

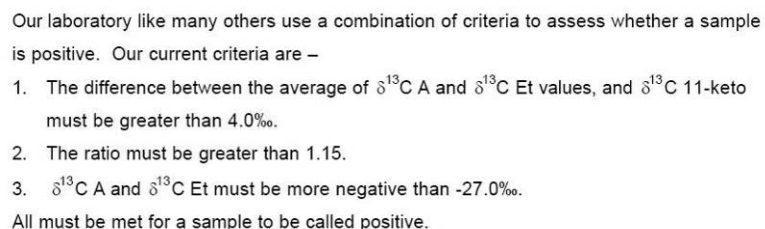
*In no case is there clear documentation that the abnormality of just one metabolite is sufficient to call a test positive for testosterone.*<sup>376</sup>

The 2006 World-Anti Doping Code<sup>377</sup> is clear: “Where an anabolic androgenic steroid is capable of being produced endogenously, a Sample will be deemed to contain such Prohibited Substance where the concentration of such Prohibited

Substance or its **metabolites** or markers and/or any other relevant ratio(s) in the Athlete’s Sample so deviates from the range of values normally found in humans that it is unlikely to be consistent with normal endogenous production.”

**Q2.** Can you show me what a clearly defined set of criteria look like?

**A2.** Yes. Here, for example, is a screen shot from the Australian rules:<sup>378</sup>



Our laboratory like many others use a combination of criteria to assess whether a sample is positive. Our current criteria are –

1. The difference between the average of  $\delta^{13}\text{C A}$  and  $\delta^{13}\text{C Et}$  values, and  $\delta^{13}\text{C 11-keto}$  must be greater than 4.0‰.
2. The ratio must be greater than 1.15.
3.  $\delta^{13}\text{C A}$  and  $\delta^{13}\text{C Et}$  must be more negative than -27.0‰.

All must be met for a sample to be called positive.

**Figure 180. Screenshot of Australian IRMS positivity criteria.**

**Q3.** The American and Australian laboratory references/links provide clear documentation that all measured metabolites must be positive. However, a few laboratory personnel, from other labs, have said: “One is enough.” Why the discrepancy?

**A3.** I think those labs are wrong in their analysis of the scientific evidence.

<sup>376</sup> Laboratories are reluctant to reveal their criteria. The US, Australian, Belgium, and English labs use the *all* criteria. The German and French labs use the *any* metabolite criteria. Read more about the need for fairness in reporting laboratory criteria on page 438.

<sup>377</sup> World Anti-Doping Code The 2006 Prohibited List. 3. 2006. <http://conventions.coe.int/Treaty/en/Treaties/Html/135-2006.htm>. Accessed Dec 28, 2006.

<sup>378</sup> Australian Sports DTL Anti-Doping Research Program. 6. (2004). [http://www.aph.gov.au/SEnate/committee/economics\\_ctte/estimates/bud\\_0405/industry/addinfo/statistical\\_population\\_studies\\_mar04.pdf#search=%22Kazlauskas%20%22anti-doping%20research%20program%22%22](http://www.aph.gov.au/SEnate/committee/economics_ctte/estimates/bud_0405/industry/addinfo/statistical_population_studies_mar04.pdf#search=%22Kazlauskas%20%22anti-doping%20research%20program%22%22). Accessed Dec 30, 2006.

That each laboratory can have its own standard and that each laboratory can set its own cut-off values is intolerable.<sup>379</sup> It should not/cannot/must not be possible for an athlete's urine to be labeled positive in France and negative in the US, or vice versa.

In part, WADA's job is to unify testing procedures and prevent this from happening. Apparently, it has a long way to go.

**Q4.** *Is it possible for just one of the two androstane diols to be positive?*

**A4a.** It is possible for just one of the two diols to be positive if the exogenous steroid is *not* testosterone, but an intermediate metabolite, for example, 5 $\alpha$ -dihydrotestosterone.

However, this is not alleged here. The allegation is testosterone or a *precursor*, not a testosterone *metabolite*. This argument can be rejected because 5 $\alpha$ -dihydrotestosterone (DHT) was not found in Landis's sample and the ratio between androsterone and etiocholanolone (Andro/Etio) is normal (see the document package and USADA0057).

**A4b.** It is also possible when the diol values are close, and one is just over the limit and one just under. The scientific literature does *not* support the results of the 5-alpha androstane diol and 5-beta androstane diol values being more than 2.5 units apart. For more documentation, see page 296.

As Don Catlin, Director of the WADA-approved US Olympic testing laboratory at UCLA stated in a response to a query by Richard Auchus at the at USADA's 2<sup>nd</sup> Annual Symposium on

IRMS:<sup>380</sup>

“Auchus: The pattern where you see the 5 $\alpha$  Adiol but not the 5P Adiol, couldn't that be explained by someone taking a combination of DHT and T, and shouldn't that be reported as positive?

Catlin: It could be explained that way and other ways. It is the “shouldn't it be proven as positive” that is the problem. Because as soon as your report it positive you have to prove it. Not only do you have to prove it, you better well have a lot of clinical studies that demonstrate it or you will lose in the CAS.”

**Q5.** So, the 5-beta-androstane diol is okay. Why is the 5-alpha-androstane diol abnormal?

**A5.** There are many possible reasons. To name just a few:

The laboratory does not properly identify analytes.

The laboratory violates WADA, ISO, and its own procedures.

We have shown clear sample number problems. Adulteration or spiking of the sample is a possibility.

We have shown wide variances in the labs testing of the 'A' sample testosterone and epitestosterone values. Laboratory errors are a possibility.

We have shown a contamination/degradation issue. Bacteria may selectively metabolize different testosterone isotopes.

Bottom line: (1) It is not up to us to explain why only one is positive. If anything, it is up to the lab. (2) The science does not support calling Landis's test positive.

<sup>379</sup> “There is a body of literature that examines threshold parameters for decision. Where the results of the standard-setting process have highly significant consequences, and especially where large numbers of examinees are involved, those responsible for establishing cut scores should be concerned that the process by which cut scores are determined be clearly documented and defensible” (p. 54). Nunnally, J. C., & Bernstein, I. H. Psychometric theory. NY: McGraw-Hill. 54. (1994.).

<sup>380</sup> Uncertainty in GC/C-IRMS Measurement as Applied to Doping Control. 2<sup>nd</sup> Annual USADA Symposium on Anti-Doping Science. Application of Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry to Doping Control. Los Angeles. Page 87. (2003). USADA0882. Linked at: <http://arniebakercycling.com/books/wiki.htm>.



**Q6.** How solid is the science documenting that the IRMS test is a good test, even IF all metabolites were positive?

**A6.** Although the test has been portrayed as “foolproof,” it is not.

Drug labs would have us believe that tests are rigorous and without problems. However, as in all science, problems may be found with testing procedures, and those procedures abandoned once “better” tests are developed. Although we may be assured these new tests are fine, they must withstand unbiased scientific scrutiny.

In medicine, it is a common scenario that when tests are first used to determine the presence of disease, they lack good accuracy.<sup>381</sup> It is only with increased research into biochemical pathways, improvements in laboratory technology, and the evaluation of increasing numbers of test subjects, that tests that are more accurate are developed.

An example of this is the detection of HIV infection. When AIDS was first recognized as a disease in the early 1980s, (1) the initial blood tests looked at just broad measures of immune function. In 1984, (2) the first HIV antibody test was developed using an enzyme immunoassay. It had a high sensitivity, but many people who tested positive were false positives. This was followed by (3) the development of a more specific antibody test, the Western Blot, that weeded out most of the false-positive results. Since 2001, (4) donated blood in the U.S. has been screened with even more accurate tests. These tests, nucleic-acid-based tests, directly examine the DNA in the HIV genes themselves.

The T/E ratio is now used as a screening test. It is inexpensive, but has been fraught with problems. Here is just one major

problem and misconception about the test: A value over 4 does NOT mean the presumption of doping. Many athletes appear to have naturally high T/E ratios. WADA tests about 200,000 samples a year. Consider that about 4,000 (2%) will test out at a ratio over 4:1. However, of those with a screening ratio between 4 and 6, more than 99.5% will not go on to be confirmed to have an adverse analytical finding.<sup>382</sup> Note: Landis’s Stage 17 sample was screened twice. Once at 4.9, once at 5.1.

At this point, tests for the use of testosterone doping are still in the process of being developed. They are indirect measures.

Very few subjects reported in the scientific literature have been administered testosterone and had their IRMS metabolites studied – just 35 people in the studies cited below.

Testing procedures and positivity criteria are in a state of flux within laboratories and between laboratories.

The IRMS test cannot be considered a “foolproof” test.

If Landis is to be found positive for testosterone or its precursors, at a minimum, the finding must be based on science, limited as the science is.

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<sup>381</sup> That being low sensitivity (rate of true positives) or low specificity (rate of true negatives) or a combination of both.

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<sup>382</sup> Delbeke, F. Report at the Anti-Doping Convention meeting of the Advisory Group on Science, Strasbourg. July 11, 2006. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

Reference <sup>1</sup>	Subjects <sup>2</sup>	Metabolite <sup>3</sup>	Metabolite	Comments	Metabolite Positivity
		5αA or Andro	5βA or Etio		
Landis Stage 17		Positive -(6.39)	Negative (-2.65)		One
Lab Guidelines					
<a href="#">World Anti-Doping Code 2006</a>				"Metabolites"	All
<a href="#">Australian Sports DTL 2004</a>				WADA lab. Andro and etio	Clearly both
<a href="#">UCLA 2001</a>	73	Positive	Positive		Clearly both
<a href="#">WADA 2004</a>		Ambiguous	Ambiguous	"Metabolite(s)"	Ambiguous
Studies:					
<a href="#">Aguilera 1996</a>	8	Positive	Positive	WADA lab. 5αA and 5βA	Both
<a href="#">Aguilera 1999</a>	10	Positive (-4.6)	Positive (-4.7)	WADA lab. 5αA and 5βA	Both
<a href="#">Aguilera 2000</a>	1	Positive	Positive	WADA lab. Andro and etio	Both
<a href="#">Aguilera 2001</a>	2	Positive (-7.5)	Positive (-5.4)	WADA lab. 5αA and 5βA	Both
<a href="#">Baume 2006</a>	7	Positive	Positive	WADA lab. Andro and etio	Both
<a href="#">Maitre 2004</a>	1	Positive	Positive longer than α	WADA lab. 5αA and 5βA	Both
<a href="#">Shackleton Phillips 1997</a>	5	Positive (less abnormal)	Positive (more abnormal)	5αA and 5βA	Both
<a href="#">Shackleton Roitman 1997</a>	1	Positive	Positive	5αA and 5βA	Both
Symposia					
<a href="#">Catlin 1999</a>				WADA lab. "Metabolites"	All
<a href="#">Flenker 2005</a>				"Metabolites"	All

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...continues from previous page

Reference <sup>1</sup>	Subjects <sup>2</sup>	Metabolite <sup>3</sup>	Metabolite	Comments	Metabolite Positivity
<b>Review Articles</b>					
Ayotte 2001				RADA. "Metabolites"	All
<a href="#">Catlin 1997</a>				WADA lab. "Metabolites"	All
<a href="#">Kicman 2003</a>				"Metabolites"	All
<a href="#">Saudan 2006</a>				"Metabolites"	All
<b>CAS Cases</b>					
<a href="#">CAS Barry Forde 2006</a>		Positive (-5.29)	Positive (-6.33)	5αA and 5βA	Both
CAS Landaluce 2006		Positive (-4.48)	Positive (-4.85)	5αA and 5βA	Both

**Table 48. Metabolite positivity. Laboratory guidelines, testosterone studies, symposia, review articles, and CAS IRMS cases. See the text in Question 1a on page 282.**  
<sup>1</sup>References are web-linked. <sup>2</sup>Number of subjects administered testosterone. <sup>3</sup>Metabolite values are the subtraction values obtained from urinary reference steroids.  
RADA (Recent advances in doping analysis)-articles are WADA-laboratory non-peer reviewed articles presented at annual meetings of Cologne Workshops on Dope Analysis.

## Appendix C:

### \*\*\*Statistical Arguments

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Following are statistical arguments demonstrating that the T/E Ratio and IRMS tests, as apparently currently used by the French Laboratoire National de Dépistage du Dopage (LNDD), are flawed.

For a primer on statistical terms, see *Appendix C.3 Doping Test Statistical Terms* on page 297.

#### Main Points

- We are not arguing here that the T/E ratio or IRMS tests are bad tests. We are arguing that the application of the tests by some laboratories, specifically LNDD, is flawed.
- **T/E ratio.** Setting the cutoff at 4:1, considering the apparent incidence of doping and the false-positive rate of the IRMS test, is a flawed method for determining athletes who have doped. The T/E cutoff is set too low.
- **IRMS.** Setting the cutoff at 3 delta units, and the allowing of *any* rather than *all* metabolites to be indicative of a positive test, is a flawed method for determining athletes who have doped.

#### Analogy

Consider using weight as a test for obesity.

Most people weighing over 400 pounds are truly fat.

If one sets a weight of 400 pounds as a cutoff for obesity, most positives will be true positives.

The number of fat persons found will be relatively small.

If one wants to “catch” more fat people, lowering the weight to 300 pounds will find more positives.

Lowering the cutoff still further, to 200 pounds, will find even more fat people.

A movement to “rout out” all fat people by lowering the cutoff to 150 pounds will find still more fat people.

At some point, however, lowering the cutoff too far will risk labeling people as fat who are not.

The 150-pound cutoff will likely result in many false positives.

Even at 200 pounds, the cutoff may be too low, and false positives will be a problem. Consider that a toned 6’2” muscular NFL linebacker might weigh 220 pounds.

#### What Makes a Good Test?

The sensitivity and specificity of a test, depending upon context, help determine what a good test is.

Again, for a primer on statistical terms, see *Appendix C.3 Doping Test Statistical Terms* on page 297.

Again, false positives are *expected*. Ideally, the false-positive rate of any test is known. In many circumstances, by correctly setting test limits or cut-offs, the false-positive rate is less than 1%.

In the anti-doping setting, because of the consequences of falsely accusing an athlete, the false-positive rate must be set much lower than 1%.

In laboratory proficiency testing, the WADA International Standard for Laboratories (ISL) states:<sup>383</sup>

**“No false positive drug identification is acceptable for any drug.”**

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<sup>383</sup> WADA International Standard for Laboratories, 4.3.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

Considering that WADA labs tested about 200,000 samples in 2005, one might interpret WADA rules to require that the false-positive rate must be set at less than 1 in 200,000 or 0.000005.

### The Reality of T/E Ratio Testing

Consider Figure 181. This generic curve shows the false-positive rate for a T/E ratio test with cutoff of 4. The shaded blue area relative to the total area under the blue curve is clearly more than 1%.

In order to reduce the false-positive rate, the cutoff must move from 4 to a higher number.

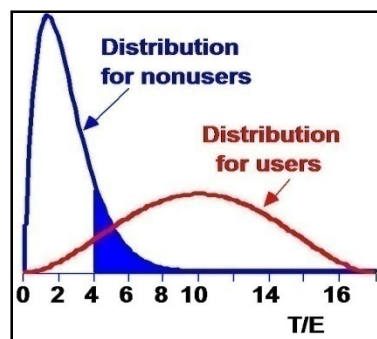


Figure 181. Generic curves for T/E ratio for nonusers and users. The shaded blue section represents false-positive results with a T/E cutoff of 4. Modified from Berry.<sup>384</sup>

*Frans Delbeke reported the detailed analysis of 955 T/E ratio tests whose reported values were between 4 and 6 in 2005.*

*(Remember, Landis's screening values were 4.9 and 5.1)*

*Only 3 tests out of 955 were confirmed to be positives.<sup>385</sup> The false-positive rate not only exceeded 1%, it exceeded 99%. This is absurd.*

<sup>384</sup> Berry, D. Personal communication dated March 30, 2007, from an unpublished paper discussion about T/E testing databases. (1997).

<sup>385</sup> Delbeke Frans. Council of Europe. Anti-doping convention. Meeting of the advisory group on science. July 31, 2006. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

Arnie's comment:

This is completely backwards. It turns out that a screening T/E ratio value between 4 and 6 is 99% confirmation of a *not* doping test result.

### The Reality of IRMS Testing

The laboratory that examined Landis's sample, LNDD, does not comply with ISL 4.3.1. quoted above.

For the ballyhooed isotope ratio mass spectrometry test (IRMS), the LNDD may have a false-positive rate *exceeding* 10%.<sup>386</sup>

However, even a test with 99.9% sensitivity and 99.9% specificity may not be good enough if the prevalence of a condition is very low.

Anti-doping officials apparently do not give enough regard to prevalence/prior probability in devising test protocols.

For a fuller discussion, see *Sensitivity and Specificity*<sup>387</sup> and *Inferences about Testosterone Abuse among Athletes*.<sup>388</sup>

<sup>386</sup> For details about IRMS statistics, see page 291.

<sup>387</sup> Sensitivity and Specificity, Medical University of South Carolina (2000). <http://www.musc.edu/dc/icrebmsensitivity.html>. Accessed Sep 2, 2007.

<sup>388</sup> Berry, D.A., and Chastain, L. Inferences about Testosterone Abuse among Athletes. Chance. 17 (5-8). (2004). <http://www.amstat.org/publications/chance/172.berry.pdf>. Accessed Sep 2, 2007.

## Appendix C.1

# T/E Ratio: Negative Test

*Landis's IRMS test result is likely a lab mistake rather than a true positive—by WADA's own figures and lab testing protocols.*

With a T/E screening ratio between 4 and 6, we are uncertain that a positive IRMS test result is a true positive.

### Athlete and Other Population Variants

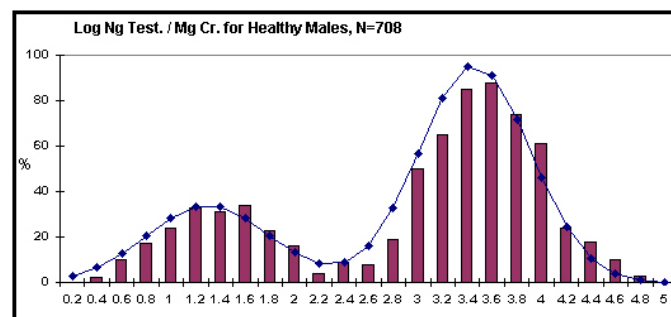
Do different groups have different norms?

Do aerobic endurance athletes, professional cyclists, or Tour de France athletes differ from the norms of the general population?

Don Catlin is one of the world's experts on anabolic steroids. His work shows an approximately 100-fold (2-log) difference in a urinary testosterone parameter between Asian and non-Asian whites.

Post-AAA hearing reports suggest that there may be dozens of testosterone-metabolizing enzymes, and that deficiencies or two copies of the genes that code for these enzymes may result in lower or higher probabilities of false positives.<sup>389</sup>

Such population differences show how validity may be crucially dependent upon the reference group matching the athlete.



**Figure 182. Low-mode/high-mode.** Urine testosterone concentrations are determined in part by ethnicity. The figure shows that the distribution of log urine testosterone/mg creatinine in a large group of healthy male medical students has two peaks. Generally, the Asian males are distributed to the low mode group while those of non-Asian males are located in the high mode. Asians excrete much less testosterone relative to muscle mass than non-Asians.<sup>390</sup>

### Background

Landis was tested twice with a screening T/E ratio. His values were 4.9 and 5.1. This precipitated his IRMS test and “doping positive.”

In 2005, WADA lowered the T/E screening cutoff from 6 to 4. Previously, it had been even higher.

Of 789 T/E results between 4 and 6 subjected to confirmation by IRMS in 2005, only 2 were confirmed.<sup>391</sup>

The cutoff criteria for positive IRMS testing, depending upon the lab, are set between 1.4 and 3 standard deviations (SD) of relevant metabolites.

<sup>389</sup> Kolata, Gina. The New York Times. April 30, 2008. Accessed May 18, 2008.

<sup>390</sup> Catlin, D. UCLA faculty page.  
[http://research.mednet.ucla.edu/institution/personnel?personnel\\_id=45462](http://research.mednet.ucla.edu/institution/personnel?personnel_id=45462).  
Accessed September 2, 2007.

<sup>391</sup> Delbeke, F. Report at the Anti-Doping Convention meeting of the Advisory Group on Science, Strasbourg. July 11, 2006. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

## Math

In 2005, 2 out of 789 T/E-ratio tests between 4 and 6 subjected to follow-up IRMS testing were confirmed as positive. For simplicity, let us say 2.5 per 1,000.

What is the false-positive rate of the IRMS test?

We are not certain. Different laboratories use different methods. In the US UCLA lab, the false-positive rate less than 0.2 %. In the French LNDD, the false-positive rate is at least 7%.

For a fuller discussion, see page 293.

If we assume that by test design the false-positive rate is set at 2 tests per 1,000, the true-positive rate is estimated at 0.5 tests per 1,000. (The total positives—2.5 per 1,000 *minus* the false positives—2.0 per 1,000.)

In this case, the likelihood of random-lab error vs. a true positive is 4 to 1 (2.0 to 0.5).

When the effect of systematic error and laboratory mistakes are also included, the *a priori* likelihood that a T/E-screening ratio between 4 and 6 will reveal a true positive is even less.

## Bottom Line: Comfortable Satisfaction

The standard is: Comfortably satisfied that the IRMS test result is a true positive.

Whether comfortably satisfied is 90% certain, 95% certain, or 99.7% certain, it is clear from WADA's own criteria and its own testing, that with a T/E screening ratio between 4 and 6, that one might be, at most, about 20% certain that an abnormal IRMS test result is a true positive for any athlete.

The above is an admittedly crude calculation. The bottom line is that the T/E test combined with IRMS positivity (as currently unclearly defined) has such a low positive predictive value at values below 6 that **there cannot be comfortable satisfaction** of a true positive.

Said differently, after a T/E test ratio between 4 and 6, there are so few positive IRMS tests that **the likelihood of a false positive is high—too high for comfort.**

Poor laboratory quality—known lab errors, contamination, unreliability, and criteria for a positive test without a reference population—argue even more strongly against the IRMS test results being acceptable.



## Appendix C.2

# IRMS Test: A Good Test Made Bad

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This argument has two parts:

- *Part A. All vs. Any, Cutoff Delta at 3 per Mil*
- *Part B. Diol Delta Far Apart*

## Appendix C.2

### Part A. All vs. Any, Cutoff Delta at 3 per Mil

The use of the (1) 3-delta-unit-standard combined with the (2) *any-or-one-metabolite-standard* is unacceptable from a test design point of view.

#### Background

Laboratories and adjudicating bodies must be confident that a positive doping test result is a true positive, and not a false positive.

The IRMS (isotope ratio mass spectrometry) test has been touted as the gold standard.<sup>392</sup>

LNDD laboratory director Ceaurriz has been quoted as saying: “It’s foolproof. This analysis tells the difference between endogenous and exogenous. No error is possible in isotopic readings.”

(For more on statistical terms, see *Appendix C.3*  
*Doping Test Statistical Terms* on page 297.)

How many subjects have been given testosterone and studied with IRMS testing in published peer-reviewed studies?

The total number of testosterone-use subjects found in these studies is 35.

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<sup>392</sup> USA Today. Ruibal, S. August 4, 2006. [http://www.usatoday.com/sports/cycling/2006-08-04-landis-doping-test\\_x.htm](http://www.usatoday.com/sports/cycling/2006-08-04-landis-doping-test_x.htm). Accessed Sep 1, 2006.

It is not surprising, then, that Frans Delbeke, reporting the findings of the World Association of Anti-Doping Scientists (WAADS) noted:

“...reservations have been expressed on the validity of the IRMS method, scientific background for its use would also be appreciated”

“...urged WADA to gather and publish data”

“...recommended that WADA continues to support research on analytical methods to detect exogenous testosterone.”<sup>393</sup>

Arnie’s comment:

Of course, there is no such thing as a foolproof test.

Considering the volume of errors shown throughout this book in Landis’s stage 17 analysis, Ceaurriz appears foolish to me.

When one considers that the FDA often approves drugs based on studies of thousands, and then occasionally has to withdraw a drug from the market or issue a warning because of previously unknown side effects, it is clear that the science behind the testing is quite limited.<sup>394</sup>

The IRMS test, as developed, analyzed, and reported by the University of California Los Angeles Olympic Analytic Laboratory (UCLA), is established so that:

1. The cutoff between a positive and a negative test for any given metabolite is set at three standard deviations from the mean.
2. Two metabolites are examined: 5-alpha-androstanediol (5α-Adiol), 5-beta-androstanediol (5β-Adiol).
3. Both metabolites must be abnormal to assert a positive test.<sup>395</sup>

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<sup>393</sup> Anti-doping convention. Meeting of the advisory group on science. July 31, 2006.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>394</sup> In the diet industry alone, despite extensive testing prior to release, consider that Redux (dexfenfluramine) was withdrawn when associated with pulmonary hypertension and that Phen/Fen (phentermine and fenfluramine) was withdrawn when linked to valvular heart disease.

<sup>395</sup> UCLA Olympic Laboratory. Client CIR Notice. 1. Jun 22, 2001.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

## Errors and Standard Deviation

*Experimental uncertainty* is due to random errors, systematic errors, and mistakes.

- *Random errors* are statistical fluctuations (in either direction) in the measured data. Random errors often result from the experimenter's inability to take the same measurement in exactly the same way to get exactly the same number.
- *Systematic errors*, by contrast, are reproducible inaccuracies that are consistently in the same direction. Systematic errors are often due to a problem that persists.
- *Mistakes* made in protocol, calculations, or in reading an instrument *are generally not considered in error analysis*. Although test design often assumes that the experimenters are careful and competent, this is often not the case.

In this section, we will mostly limit our discussion to random errors. Keep in mind that laboratories are, in addition, subject to systematic errors and mistakes.

### UCLA Laboratory Reference Population

For the following argument, we have taken expected control values from the largest published study in peer-reviewed literature, Aguilera 2001.<sup>396</sup>

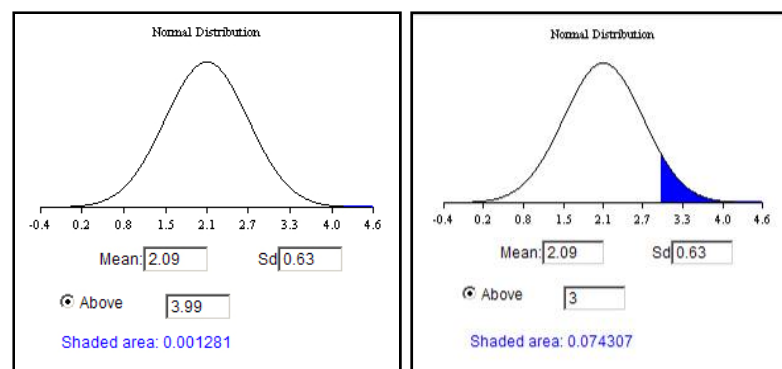
For 5-alpha-androstanediol, we have assumed a non-doping mean delta value of 2.09 and a standard deviation of 0.63 delta units. For 5-beta-androstanediol, we have assumed a non-doping mean delta value of 1.43 and a standard deviation of 0.68 delta units.

In a normal distribution, when a doping test cutoff is set at 3 standard deviations, 99.73% of truly non-doping values will fall within the cutoffs.

We are concerned with errors above three standard deviations, not with those below three standard deviations; therefore, we are concerned with half this value.

Therefore, random errors (statistical variation) will result in a false-positive doping test result 0.27% / 2 or roughly 1.3 times in 1,000.

This is one criterion of the US laboratory at UCLA.



**Figure 183.** As the cutoff for a positive test for 5-alpha-androstanediol shifts from 3.99 delta units (UCLA, left) to 3.00 delta units (LNDD, right), the standard deviation shifts from 3.0 (left) to 1.4 (right) standard deviations. The false-positive percentage (blue area under the curve, hardly visible on the left) increases from 0.1 per hundred to 7.4 per hundred.

If multiple metabolites are tested, requiring *all* to be abnormal reduces the false-positive rate. Requiring *any* to be abnormal further increases the false-positive rate.

When the doping test cutoff is set at 1.4 standard deviations, random errors (statistical variation) will result in a false-positive doping test result 7.4 times in 100.

This is one criterion of the French LNDD.

<sup>396</sup> Aguilera, R et al. Performance Characteristics of a Carbon Isotope Ratio Method for Detecting Doping with Testosterone Based on Urine Diols: Controls and Athletes with Elevated Testosterone/Epitestosterone Ratios. *Clinical Chemistry* 47 (2) 292-300. (2001). Linked at: <http://arniebakercycling.com/books/wiki.htm>.

A different set of assumptions might be made from Maitre A, et al., Urinary analysis of four testosterone metabolites and pregnanediol by gc-cirms after oral administrations of testosterone. *J Anal Toxicol.* 28, (2004).

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

If more than one metabolite is tested, the rate of false positives will *decrease* if *all* metabolites determine a positive test.

If more than one metabolite is tested, the rate of false positives will *increase* if *any* one metabolite may determine a positive test.

If two independent metabolites are tested, and *both* must be positive, the error rate will be the product (multiplication) of the false-positive rate.

If two independent metabolites are tested, and *either* may be abnormal to determine a positive test, then the false-positive rate, for small numbers, will be close to the sum of the individual false-positive rates.

If even more independent metabolites are tested, the false-positive rate will continue to decrease or increase depending upon whether, respectively, the *all* or *any* criteria is used.

### **LNDD Reference Population**

As noted on Exhibit B, page 10, the LNDD has not developed its own reference population.

17. (1) The requested documents fall within the scope of LNDD's ISO accreditation. (2) The requested documents fall within the scope of LNDD's ISO accreditation; however, the highs and lows of the reference range are set forth in the laboratory documentation package. See USADA page 352. The term "haute" means high. The term "basse" means low. (3) This was not calculated. (4) The requested documents fall within the scope of LNDD's ISO accreditation. The reference range is based on athlete samples reported negative, not on a known population of controlled research subjects. The reference range is used merely for comparison and information.

**Figure 184. LNDD Exhibit B, page 10. Reported highs and lows are those of athletes reported as negative.**

It is impossible to assess accurately the false-positive rate of LNDD based on its own reference population—because there is no such population.

The LNDD has had no internal means to determine if its IRMS criteria are valid. It has no means to determine whether the cutoffs it

uses—for its machines and procedures—are set at 3 standard deviations, or any other level.

By giving the highs and lows of its own negatives, it is merely promulgating a circular argument with no scientific validity.

### **UCLA vs. LNDD: A Good Test Made Bad**

#### **UCLA**

The University of California at Los Angeles Olympic Analytic Laboratory (UCLA) uses a 3 *standard deviations* cutoff of uncorrected measurements for two metabolites of testosterone.<sup>397</sup>

Since these metabolites have different means and standard deviations in their control population, the delta cutoffs of these metabolites differ—3.99 delta units for the 5-alpha androstanediol and 3.47 for the 5-beta androstanediol.

The UCLA laboratory tests about 40,000 samples a year.

For every 10,000 samples tested, the IRMS test, with cutoffs for individual metabolites set at 3 standard deviations, will find about 13 false positives if just one metabolite is tested.

Since the UCLA laboratory tests the two diol metabolites, its overall false-positive rate will decrease up to: 0.13% x 0.13% or about 2 in a million.

If the two metabolites are dependent, this value will be higher.<sup>398</sup>

<sup>397</sup> UCLA uses uncorrected delta unit differences. LNDD uses corrected values.

In our argument, we will assume that the uncorrected and corrected delta unit differences are equivalent—although they are not. However, since corrected delta unit values are larger in doping cases, accounting for these different methods would magnify our argument and increase LNDD's false-positive rate to 10% for 5-alpha-androstanediol alone.

(In Maitre, 2004, negative shifts of the  $\delta^{13}\text{C}$ -value due to the formation of an acetate were corrected as follows:  $D_{\text{OH}} = D_{\text{OAC}} + 2m(D_{\text{OAC}} - D_{\text{AC}})/n$

Where  $D_{\text{OH}}$  is  $\delta^{13}\text{C}$ -value for the underivatized steroids,  $D_{\text{OAC}}$  is the  $\delta^{13}\text{C}$ -value for the acetylated steroids,  $D_{\text{AC}}$  is the  $\delta^{13}\text{C}$ -value for the acetylating reagent,  $n$  is the number of carbon atom in a molecule, and  $m$  is the number of hydroxyl groups to be acetylated. All subsequent  $\delta^{13}\text{C}$ -values have been corrected for this negative shift.

Using this method, aligning UCLA and LNDD would result in LNDD effectively using a cutoff of 1.3 standard deviations.)

<sup>398</sup> It is uncertain as to what extent the metabolites are dependent. The more dependent they are, the weaker this argument becomes. However, the weaker this argument, the stronger the Part B argument that the 3.47 delta unit difference between the diols must be due to a

If IRMS is accepted as the gold standard and using this test an athlete is tested 10 times at UCLA, say as leader of the Tour de France, he will have up to a 1 in a hundred chance of having a false-positive test.

### **LNDD**

The French Laboratoire National de Dépistage du Dopage (LNDD) uses a 3 *delta unit* cutoff.

Since these metabolites have different means and standard deviations in their control population, based on the UCLA laboratory reference population, these delta cutoffs correspond to 1.4 standard deviations for the 5-alpha androstenediol and 2.3 standard deviations for the 5-beta androstenediol.

(Using the limited data available from the LNDD reference population, the values below will be similar.)

LNDD tests about 10,000 samples a year.

For every 10,000 samples tested, the IRMS test, with cutoffs for individual metabolites set at 1.4 standard deviations, will find 740 false positives if just one metabolite is tested.

For every 10,000 samples tested, the IRMS test, with cutoffs for individual metabolites set at 2.3 standard deviations, will find 100 false positives if just one metabolite is tested.

At a minimum, using *only* the 5-alpha androstenediol metabolite, 7.4% of samples would be expected to be false positives.

At a maximum, if one assumes that the four metabolites tested by the French laboratory are independent, and the false-positive rate of two follow the 5-alpha androstenediol and the false-positive rate of the other two followed the 5-beta androstenediol, the false-positive rate of the French laboratory could be as high as 7.4% + 7.4% + 1.0% + 1.0% or about 17%.

Said again, since LNDD tests four metabolites, its overall false-positive rate will increase up to approximately 16.8 in 100.

If IRMS is performed on 100 samples, using LNDD criteria, up to 17 samples will be expected to be falsely labeled as positive.

If the two metabolites are dependent, this value will be lower.

If an athlete is IRMS-tested 10 times at LNDD, he will have an at least 50% chance of having a false-positive test.<sup>399</sup>

Clearly, this is unacceptably high.

**The LNDD is at least 50 and as much as 20,000 times more likely to return a false positive than the UCLA laboratory.**

This is an unacceptable difference.

### **Proof of False Positives at LNDD?**

Again, we are not arguing here specifically about the IRMS test itself, but about the definition of a positive based on (1) delta unit limits and (2) *all* vs. *any* metabolites.

### **Aguilera, 2001**

UCLA performs more doping tests than any other laboratory in the world—39,775 in 2005, more than three times as many as the next busiest laboratory at Cologne, Germany, more than four times as many as the LNDD in France.<sup>400</sup>

UCLA has more experience than any other laboratory in the world.

Half the studies shown in Table 48 on page 286 originate from the UCLA lab.

Review UCLA's positivity criteria.<sup>401</sup>

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laboratory error. To an extreme, if the metabolites have a 100% correlation, any diol differences are logically unexplainable and therefore exculpatory.

<sup>399</sup> Based on 100% dependent metabolites, looking at just the 5-alpha-androstenediol metabolite. Formula:  $[1-(1-0.074)^{10}]$

<sup>400</sup> WADA 2005 Laboratory Statistics. 3. (2006). [http://www.wada-ama.org/rtecontent/document/LABSTATS\\_2005.pdf](http://www.wada-ama.org/rtecontent/document/LABSTATS_2005.pdf). Accessed Dec 30, 2006.

<sup>401</sup> UCLA Olympic Laboratory. Client CIR Notice. Jun 22, 2001. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

	$\delta^{13}\text{C}$ , ‰			Difference, ‰	
	5 $\beta$ A	5 $\alpha$ A <sup>a</sup>	5 $\beta$ P <sup>b</sup>	5 $\beta$ P – 5 $\beta$ A	5 $\beta$ P – 5 $\alpha$ A
Mean	-25.69	-26.35	-24.26	1.43	2.09
SD	0.92	0.68	0.70	0.68	0.63
CV, %	3.6	2.6	2.9		
Mean + 3 SD	-22.92	-24.31	-22.15	3.47	3.99
Mean – 3 SD	-28.46	-28.39	-26.37	0.62	0.18
Maximum	-23.90	-24.55	-22.92	3.17	3.72
Minimum	-27.82	-27.89	-25.49	-0.08	0.16
Max – Min	3.9	3.3	2.6		

<sup>a</sup> Mean significantly different from 5 $\beta$ A.  
<sup>b</sup> Mean significantly different from 5 $\beta$ A and 5 $\alpha$ A.

**Figure 185. Aguilera 2001. Control group of 73 subjects. Red circles show maximum delta/delta values over 3 for the two metabolite differences, 5-beta androstenediol, and 5-alpha androstenediol.**

Now consider Aguilera 2001,<sup>402</sup> UCLA's defining study for validating the IRMS test and setting its positivity criteria.

Please see Table 3 from that study, reproduced in Figure 185:

Note that normal controls were found to have diol differences above three delta units.

Consider the expected results of using the French laboratory positivity criteria to the UCLA controls (known non-drug using negative subjects).

Data from a pivotal IRMS study from the largest WADA laboratory in the world, UCLA, show that their own controls would be positive for doping if judged by LNDD positivity criteria.

**Conclusion: The LNDD positivity criteria are fundamentally flawed.**

<sup>402</sup> Aguilera, R et al. Performance Characteristics of a Carbon Isotope Ratio Method for Detecting Doping with Testosterone Based on Urine Diols: Controls and Athletes with Elevated Testosterone/Epi-testosterone Ratios. *Clinical Chemistry* 47 (2) 296-300. (2001). Linked at: <http://arniebakercycling.com/books/wiki.htm>.

### Flenker, 2005

WADA commissioned a study to look at the effects of changes in diet on carbon isotope ratios.<sup>403</sup> Although Flenker has not published this study in the peer-reviewed literature, an abstract is available.<sup>404</sup>

The slide show given by Flenker at GasIR<sup>405</sup> has been analyzed by Tom Fine.<sup>406</sup>

Fine finds a 3.2% false-positive rate, using apparent LNDD criteria, in the repeated-over-time analysis of the six subjects not using anabolic agents.

**Again, the LNDD positivity criteria are fundamentally flawed.**

### Summary

**The use of the (1) 3 delta unit standard combined with the (2) any or one metabolite standard is unacceptable from a test design point of view.**

<sup>403</sup> Influence for Changes in Diet on the Dynamics of C13/C12 in Selected Urinary Steroids. [http://www.wada-ama.org/rtecontent/document/b5\\_2003.pdf](http://www.wada-ama.org/rtecontent/document/b5_2003.pdf). Accessed Oct 1, 2006.

<sup>404</sup> Fleckner, U. et al. Influence of dietary changes on the dynamics of 13C/12C in selected urinary steroids. 9. (2005). [http://www.bgc-jena.mpg.de/service/iso\\_gas\\_lab/gasir2005/GasIR\\_2005\\_Program\\_and\\_Abstracts.pdf](http://www.bgc-jena.mpg.de/service/iso_gas_lab/gasir2005/GasIR_2005_Program_and_Abstracts.pdf). Accessed Oct 1, 2006.

<sup>405</sup> Flenker, U. Endogenous Steroids in Doping Control. (2005). [http://www.bgc-jena.mpg.de/service/iso\\_gas\\_lab/gasir2005/presentations/ASI2005\\_U\\_Flenker.pdf](http://www.bgc-jena.mpg.de/service/iso_gas_lab/gasir2005/presentations/ASI2005_U_Flenker.pdf). Accessed Oct 1, 2006.

<sup>406</sup> Fine, T. Floyd Landis' Testosterone, WADA, and Abused Science. [http://hea-www.harvard.edu/~fine/opinions/testosterone\\_again.html](http://hea-www.harvard.edu/~fine/opinions/testosterone_again.html). Accessed Oct 28, 2006.

## Appendix C.2

### Part B. Diol Delta Far Apart

Testosterone interconverts with androstenedione. These two compounds yield the four metabolites commonly measured by IRMS, which interconvert in pairs.

5-alpha androstanediol metabolically interconverts with androsterone. 5-beta androstanediol interconverts with etiocholanolone.

In theory, these four metabolites rise and fall together.<sup>407</sup>

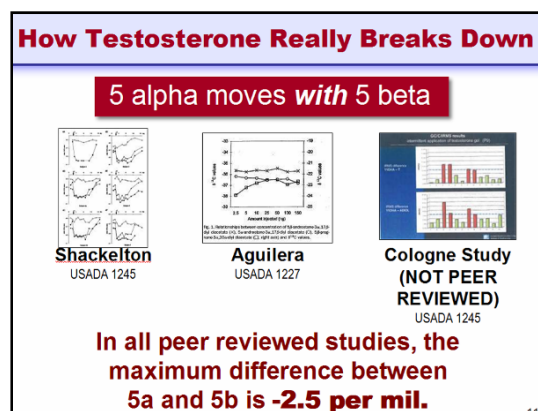
It is rare for one diol to be abnormal while the other is normal. The degree of difference between Landis's diol values, about 4 delta units, is a red flag to analysts that something is wrong with the test.

Arnie's comment:

In an analogous medical situation, hematocrit values are roughly 3 times hemoglobin values. An individual with a hemoglobin of 15 might be expected to have a hematocrit of 45. A physician who encounters a laboratory report stating that the hemoglobin is 15 and that the hematocrit is 35 is apt to suspect a lab error—because the results do not make sense.

Landis's values argue against an accurate test from LNDD, or some other unusual explanation, currently unknown, and unexplained by current scientific knowledge.

There cannot be scientific certainty that Landis's test is a positive.



**Figure 186. All studies in the literature show that 5-alpha androstanediol moves with 5-beta androstanediol. The marked differences between Landis's values suggest laboratory error.**

<sup>407</sup> This argument follows a similar logic to the T/E ratio test. In theory, the body produces testosterone and epitestosterone in equal quantities. Therefore, an increased testosterone to epitestosterone ratio is a sign of testosterone doping.

Although initially lauded, the test has many failings, including, to name just a few: (1) that at least 95% of those with a T/E between 4 and 6 are not confirmed to have doped, (2) that the Asian population tends to have a T/E of 0.1, and (3) that a doping subset keeps a constant T/E ratio.

Similarly, future studies may confirm a non-doping subset with just one abnormal diol.

### Appendix C.3

## Doping Test Statistical Terms

**Gold Standard:** Accepted reference standard or diagnostic test for a particular drug.

**False Positive:** The error of calling a doping test positive in someone who has *not* doped.

I tend to use the term “false positive” to refer to a *random* error and “falsely (erroneously) positive” to refer to *systematic* errors and *mistakes* (see below) although not all others, including WADA, use this distinction.

**False Negative:** The error of calling a doping test negative in someone who *has* doped.

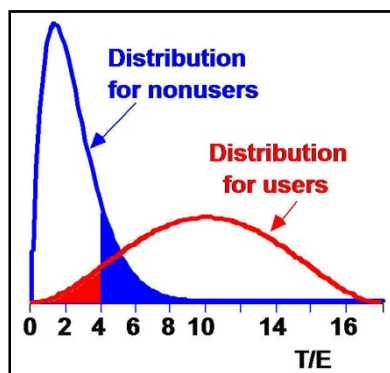


Figure 187. Generic curves for T/E ratio for nonusers and users. With a T/E cutoff of 4:1, the shaded blue section represents false-positive results; the shaded red section represents false-negative results. Modified from Berry.

**Sensitivity:** The probability of the test finding doping among those who *have* doped.

$$\text{Sensitivity} = \frac{\text{true positives}}{\text{true positives} + \text{false negatives}}$$

**Specificity:** The probability of the test finding *no* doping among those who have *not* doped.

$$\text{Specificity} = \frac{\text{true negatives}}{\text{true negatives} + \text{false positives}}$$

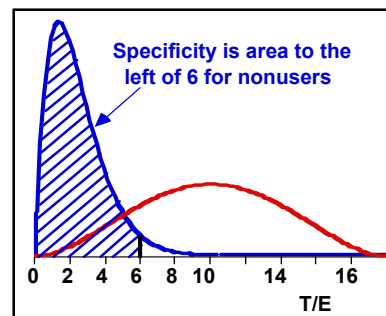


Figure 188. Specificity of the T/E ratio with a 6:1 cut-off. From Berry.

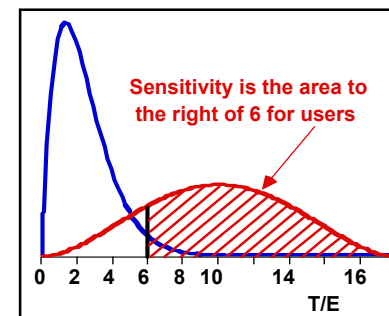


Figure 189. Sensitivity of the T/E ratio with a 6:1 cut-off. From Berry.

**Positive Predictive Value (PPV):** The percentage of people with a positive test result who actually **HAVE** doped.

$$\text{Positive predictive value} = \frac{\text{true positives}}{\text{true positives} + \text{false positives}}$$

**Negative Predictive Value (NPV):** The percentage of people with a negative test who **HAVE NOT** doped.

$$\text{Negative predictive value} = \frac{\text{true negatives}}{\text{true negatives} + \text{false negatives}}$$

**Reliable:** Repeatable. Consistent.

**Valid:** Accurate. A valid measure correctly assesses what is supposed to be measured. Validity implies reliability (consistency). A valid measure must be reliable, but a reliable measure need not be valid.

Allied to precision and accuracy. You may be able to consistently hit a target in the same spot, but it need not be the bulls-eye.



**Experimental Uncertainty** is due to random errors, systematic errors, and mistakes.

- **Random errors** are statistical fluctuations (in either direction) in the measured data due to the precision limitations of the measurement device. Random errors usually result from the experimenter's inability to take the same measurement in exactly the same way to get exactly the same number.
- **Systematic errors**, by contrast, are reproducible inaccuracies that are consistently in the same direction. Systematic errors are often due to a problem that persists throughout the entire experiment.
- **Mistakes** made in calculations or in reading an instrument *are generally not considered in error analysis*. Although test design often assumes that the experimenters are careful and competent—this is often not the case.

	Did Dope	Did Not Dope	
Positive Test	True Positive (TP)	False Positive (FP)	TP + FP
Negative Test	False Negative (FN)	True Negative (TN)	FN + TN
	TP + FN	FP + TN	

**Table 49. Statistical terms. Sensitivity = TP / TP+FN. Specificity = TN / TN+FP. Positive predictive value (PPV) = TP / TP+FP. Negative predictive value (NPV) = TN / FN+TN**

## Conditional Probabilities

The metabolites in an all vs. any arguments are not independent variables.

Bayesian logic may apply:

$$\Pr(A \cap B) = \Pr(A|B) \Pr(B)$$

The probability of A and B equals the probability of A given B and the probability of B.



## Appendix D:

### \*\*\*Whistleblower Documents

On November 14<sup>th</sup>, 2006, many media outlets, as well as attorney Howard Jacobs, received the “whistleblower” documents.

These documents, apparently leaked from a source inside the lab, document a history of errors in reporting adverse analytical findings.

The laboratory wrote to international sport governing bodies and asked them to destroy previously sent reports.

Samples declared positive included two samples with the wrong sample number (316143 vs. 316148 and 338439 vs. 338349), a sample with the wrong date (29/11/2005 vs. 29/10/2005), and a sample with a substance attributable to another athlete.

Most troubling, in a letter dated July 3, 2006, a sample from an athlete (336186) was declared positive when the athlete was negative: The LNDD admits in this letter that it contaminated its own control urines.

**These are precisely the sort of errors that riddle Landis’s document package.**

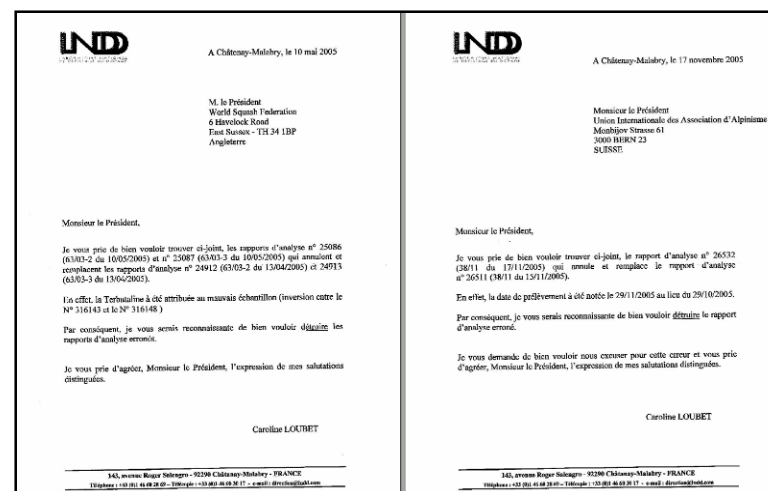
The LNDD has never publicly acknowledged nor refuted the authenticity of the substance of these whistleblower documents, although it has pointed out a spelling error in the name Châtenay-Malabry in the footer.

Dr. Olivier Rabin, WADA science director, has never officially denied the authenticity of the document bearing his signature.

The phasing and substance of these documents appears quite like known documents sent from the lab, for example, Figure 194.

**In discovery received April 6, 2007, the most serious whistleblower documents—those of a positive sample, 336186, shown to be due to LNDD contamination—have been proven to be true.**

**This is discussed more on page 301.**



**Figure 190. LNDD asks for the destruction of previously-reported positive drug tests. The document on the left notes a mistake in sample number 316143. The correct number was 316148. The document on the right notes a mistake in the report date 29/11/2005. It should have been 29/10/2005.**

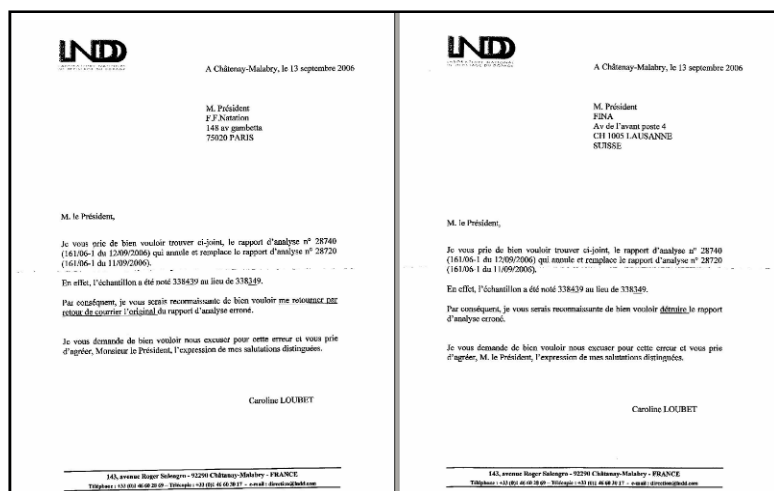


Figure 191. LNDD writes to the French National Swimming and FINA (International) Federations and asks for the return and destruction of a previously-reported positive drug test. There was a mistake in sample number 338439. The correct number was 338349.

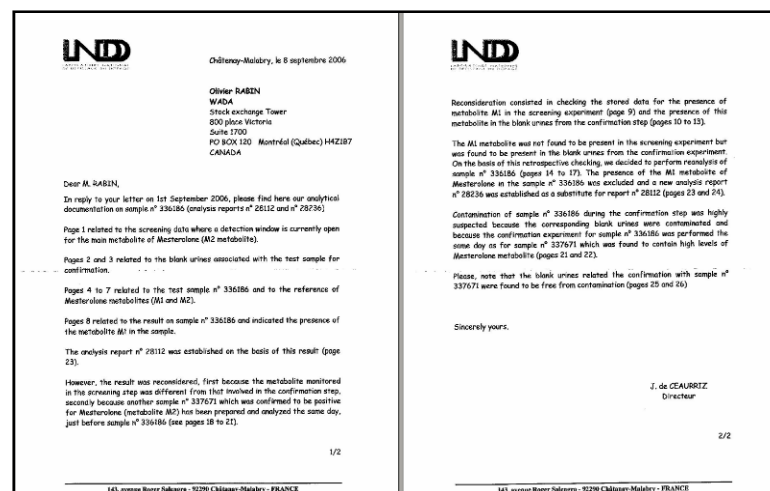


Figure 193. LNDD Laboratory Director Dr. J. de Cœuriz responds to Dr. Rabin's letter shown in Figure 192, asking for an explanation to a positive drug test report based on contamination within the LNDD.



Figure 192. On the left, the LNDD asks for the destruction of a previously-reported positive drug test. Reanalysis of sample 336186 revealed that the lab's urine blanks had become contaminated. On the right, Dr. Olivier Rabin, WADA Science Director, asks for an explanation.



Figure 194. In this document sent by the LNDD to the AFLD, and released to Landis in discovery, the style, substance, font, and font size appear identical to the whistleblower documents.

## Athlete Sample 336186

### LNDD0484-0494

In a letter dated July 6, 2006, a sample from an athlete (336186) was declared positive when the athlete was negative: The LNDD admits in this letter that it contaminated its own control urines and asks for destruction of the previous report.

This whistleblower problem has been confirmed in LNDD discovery production made April 6, 2007.

The discovery documentation is incomplete.

This appears a bigger problem than initially thought.

The laboratory apparently contaminated *both* the screening and confirmation procedures. The explanations of the Laboratory Director do not sound reasonable to me.

I find this explanation doubtful.

Note:

1. WADA Science Director Olivier Rabin asked for the chromatograms of the negative and positive controls (LNDD0488, letter of September 18, 2006)—implying that such controls are necessary. As we know in Landis's sample 995474, positive and negative controls were not part of the document package.
2. WADA Science Director Olivier Rabin noted interference peaks (LNDD0490, letter of December 9, 2006). I suspect that this was the problem—that the compounds were *not* properly identified—as in Landis's case.
3. WADA Science Director Olivier Rabin asked LNDD Director Jacques de Ceaurriz that: “evidence be provided that the corrective action has been implemented into the standard operating procedure(s). Please also confirm that appropriate remedial action has been incorporated into the laboratory's review process...”

“It is critical for this process to be able to identify such issues prior to reporting.” (LNDD 0493, letter of March 15<sup>th</sup>, 2007).

It seems LNDD incorporated appropriate remedial/corrective actions about 8 months after Landis's test.

Arnie's comment:

1. We have been supplied evidence that controls should be run; we have not been provided evidence that they were run.
2. There is evidence of matrix interference in other sample reports.
3. It appears that the laboratory was run for years under WADA/IOC/ISO control and annual accreditation audits without recognizing a failure in their verification process.

Bruce Goldberger's comment:<sup>408</sup>

It is obvious to me with this chain of letters that the LNDD laboratory has an inadequate quality assurance program. In my twenty-plus years of toxicology, I have never seen a mess like this before. The purpose of negative control samples is to identify contamination and avoid reporting false-positive results. In addition, in the letter dated December 9, 2006, Rabin indicated that there was carryover from 337671 to 336186.

Finally, one must wonder why it took WADA and LNDD six months to complete the remedial action. Perhaps LNDD's accreditation should have been suspended immediately until the investigation was complete. It seems to me that LNDD was withholding information and only after WADA dug deeper, that the truth was revealed.

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<sup>408</sup> A list of Landis's experts and their credentials is found starting on page 357.

## WADA International Standards for Laboratories<sup>409</sup>

Note: I tend to use the term “false positive” to refer to a *random* error and “falsely (erroneously) positive” to refer to *systematic* errors and *mistakes* although not all others, including WADA, appear to use this distinction.

Referring to proficiency testing, section 4.3.1:

**“No false positive drug identification is acceptable for any drug** and the following procedures are to be followed when dealing with such a situation:

- i) The Laboratory is immediately informed of a false positive error by the WADA.
- ii) The Laboratory is to provide the WADA with a written explanation of the reasons for the error within five (5) working days. This explanation is to include the submission of all quality control data from the batch of samples that included the false positive sample if the error is deemed to be technical/scientific.
- iii) The WADA shall review the Laboratory’s explanation promptly and decide what further action, if any, to take.
- iv) If the error is determined to be an administrative error (clerical, sample mix-up, etc), the WADA may direct the Laboratory to take corrective action to minimize the occurrence of the particular error in the future and, if there is reason to believe the error could have been systematic, may require the Laboratory to review and re-analyze previously run Samples.
- v) If the error is determined to be a technical or methodological error, the Laboratory may be required to re-test all Samples analyzed positive by the Laboratory from the time of final resolution of the

error back to the time of the last satisfactory proficiency test round. A statement signed by the Laboratory Director shall document this re-testing. The Laboratory may also be required to notify all clients whose results may have been affected by the error as part of its quality management system. Depending on the type of error that caused the false positive, this retesting may be limited to one analyte, a class of Prohibited Substances or Methods, or may include any prohibited drug. The Laboratory shall immediately notify the WADA if any result on a Sample that has been reported to a client is detected as a false positive. WADA may suspend or revoke the Laboratory’s accreditation. However, if the case is one of a less serious error for which effective corrections have already been made, thus reasonably assuring that the error will not occur again, the WADA may decide to take no further action.

vi) During the time required to resolve the error, the Laboratory remains accredited but has a designation indicating that a false-positive result is pending resolution. If the WADA determines that the Laboratory’s accreditation must be suspended or revoked, the Laboratory’s official status becomes ‘Suspended’ or ‘Revoked’ until the Suspension or Revocation is lifted or any process complete.”

<sup>409</sup> WADA International Standard for Laboratories, 4.3.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

## Dick Pound and Leaks

Does Dick Pound imply that the leaking of documents is okay when it exposes possible cheating of athletes, but not when it exposes possible cheating of the labs?

Is this a double standard? Hypocrisy?

A. *“For me, the big problem is the activities of hackers who entered into the system without permission, possibly against the law,” Pound told reporters in a teleconference before WADA’s executive committee meeting this weekend.”*

Reuters, November 16, 2006.

B. *“It was suggested by the World Anti-Doping Agency... that the UCI... was slow to act and apparently more interested in finding out how confidential information had become public, instead of determining whether or not the findings of the LNDD were correct, i.e. whether Armstrong had indeed used the prohibited substance r-EPO when participating in the 1999 Tour de France.”*

Vrijman Report, 2006.

## Appendix E: Error List

This is a partial list of apparently obvious documentation errors: record-keeping errors, simple math errors, or obvious errors in procedure. Many of these errors result in ISL or other violations, as summarized on page 269. This list does not address scientific principles or the validity of conclusions. Many of the pages in the document package are boilerplate machine printed protocols. Most of the pages listed below are handwritten errors.

Page	Violation	Errors	Issues	Comments
USADA Notice		2	Type Lab	The notice for 995474 is listed as "Out of Competition" The WADA accredited lab is listed as "University of California at Los Angeles"
'A' sample				
USADA0003		1+	No page	Page is missing
USADA0004		2	Sample ID Calculation	A partial lab identification number or sample number has been crossed out without initial or date. Specific gravity calculation not based on 0.8 (1.020 vs. 1.025).
USADA0007		2	Cross-out Value	Cross-out on last line. Specific gravity is listed here as 1.026. Everywhere else, it is listed as 1.025.
USADA0008	Yes	1	Sample ID	In the middle of the page, second column, a sample is listed as 99547 <u>5</u> . Landis's Stage 17 number was 99547 <u>4</u> . This page is missing in the AFLD filing. This may be an effort to cover-up this error and scientific misconduct/malfeasance.
USADA0009	Yes	1		There has been a correction of number from 99 <u>2</u> 474 to 99 <u>5</u> 474.
USADA0024	Yes	3	Sample ID Time/date Cross-outs	Landis's sample/sample number is not properly recorded as having been transported. Handwriting legibility: a 6 vs. a 4? The LNDD reception time is 9h35. It should be listed as 21h35 or 9:35 PM. There is an overwriting of blood specimen 1499 <u>8</u> 6. There is a cross-out in the bottom left signature.
USADA0027 →0028	?	1	No page	Page 23 in the LNDD numbering system is missing.
USADA0043	Yes	5	Cross-outs	2 cross-outs.
USADA0044	Yes	4	Cross-outs	2 cross-outs.
USADA0057	Yes	1	Cross-out	The date is overwritten in the AFLD version.
USADA0058		1	Custody	No record of this work in chain of custody

Page	Violation	Errors	Issues	Comments
USADA0079	Yes	7	Cross-outs Ref sol'n pH	3 cross-outs. One of lab sample number, two cross-outs of initial of lab operator. At least 3 wrong reference solution(s) for epitestosterone and for testosterone, probably more. pH test not performed, in violation of LNDD SOP I-TE-03. LNDD0533.
USADA0081		1	Calculation	Specific gravity calculation not based on 0.8 (1.020 vs. 1.025).
USADA0101		1	Extra page	This page, present in the USADA numbering system, in an extra page in the LNDD numbering system between 74 and 75
USADA0083		1	Extra page	This page, present in the USADA numbering system, in an extra page in the LNDD numbering system between 75 and 76
USADA0086		1	Extra page	This page, present in the USADA numbering system, in an extra page in the LNDD numbering system between 77 and 78
USADA0120		1	Custody	No record of overnight storage.
USADA0149		?	Sample ID	According to the record, sample f2b was used in Fraction F2. I see no explanation why this was done. There is no record of this subtraction in the chain of custody.
USADA0200	Yes	8	Cross-outs Sample	6 cross-outs. Orphaned notation. At least one reference solution errors for epitestosterone. Probable reference solution errors for testosterone (two numbers for reference solution with same concentration).
USADA0223		1	Calculation	Specific gravity calculation not based on 0.8 (1.020 vs. 1.025).
<b>'B' sample</b>				
USADA0229	Yes	3	Sample ID Time/date Cross-outs	Landis's sample/sample number is not properly recorded as having been transported. Handwriting legibility: a 6 vs. a 4? The LNDD reception time is 9h35. It should be listed as 21h35 or 9:35 PM. There is an overwriting of blood specimen 149986. There is a cross-out in the bottom left signature.
USADA0252	?	1	Custody	Opening of sample container. The method used by USCLA is that the person who opens the container signs—not the whole staff present. There is no record as to who was responsible for physically performing the procedure.
USADA0257	Yes	2	Custody	The chain of custody records that the 'B' sample IRMS was performed on August 3, 2006. There is no record of an analysis performed on August 3, 2006. There is no chain of custody documenting the work performed on August 4, 2006.
USADA0260	Yes	1	Calculation	Specific gravity calculation not based on 0.8 (1.020 vs. 1.025).
USADA0288	Yes	3	Sample ID Cross-outs Calculation	Sample number (Echantillon: <u>478/07 994474</u> .) Landis was 995474. The lab identification number is wrong. It is reported as <u>478/07</u> . It should be <u>178/07</u> . The AFLD document corrects this, improperly—and suggests scientific misconduct/malfeasance. Specific gravity calculation not based on 0.8 (1.020 vs. 1.025).

Page	Violation	Errors	Issues	Comments
USADA0300		1	Custody	No record of overnight storage.
USADA0309		1	Custody	No record of this work, and following pages in this section, in chain of custody.
USADA0323		1	Sample ID	According to the record, sample f3 was used in Fraction F2. There was a similar problem in the 'A' sample, USADA0149. The corresponding trace graphs are too small to be legible. Analyzing the wrong aliquot fraction cannot be ruled out.
USADA0352	Yes	2	Calculation	The report erroneously reports androsterone as (positive) 3.51 rather than (the negative) -3.51. The conclusion states that two metabolites were abnormal. Androsterone is wrongly reported as abnormal. Its value is not beyond the WADA's minimum positivity criteria (3.00‰) plus error range (0.8‰). Violates LNDD SOP.
Reference Solution		15		Probably 15.
Longitudinal Report		1	Date error	Date error for Stage 15.
			T/E ratio errors	At least 4.
Whistleblower Docs	?		Contaminant	Lack of control verification procedure, implemented 8 months after Tour de France 2006. For discussion, see page 301.
Discovery Docs				
LNDD0440	4.13.2.2		Page rewrite	Rewriting page, non-contemporaneous record keeping. Reference solutions suspect.
LNDD0547	Yes		Linearity	SOP says conduct tests monthly. No test in August, 2006.
LNDD0548	Yes		Linearity	SOP says conduct tests down to 1.5 nA. Level not reached.
Post AAA Docs				
LNDD1590 →1591	Yes	2	Custody	Contradictory documentation. Time of removal from refrigerator. Operator who removed.
LNDD2005	Yes		Columns	Non-contemporaneous record keeping. Column maintenance suspect.
LNDD2006	Yes	5	Cross-outs Ref sol'n	5 cross-outs. Reference solution log. "Copie conforme à l'original (copy conforming to the original). Where is original?"
LNDD2020			Linearity	File and folder names atypical. No record of folder on CD purporting to represent hard-drive records.

**Table 50. Documentation error list. Violations refer to ISO or WADA violations as discussed on page 16.**



## Appendix F: Longitudinal Data

The table below records Landis's longitudinal steroid profile based on 52 tests conducted between 1999 and 2006.

USADA expert Don Catlin's comment:

"I've seen a lot of profiles, and this one is—is very ordinary up until [Stage 17]."

### *Uncorrected for specific gravity longitudinal data*

	Date	Sample	T/E	SG	Testo	Epi	Andro	Etio	5αDiol	5βDiol	DHEA	Lab	Venue	References			
1	09/08/99	186671	2.0									LNDD	L'Avenir	USADA0492	USADA0559	USADA0575	USADA0582
2	09/18/99	185105	2.1									LNDD	GPdNations	USADA0492	USADA0559	USADA0575	USADA0582
3	01/26/00	55383	0.0									Penang	Langkawi	USADA0568	USADA0492		
4	04/30/00	311370	2.1									Madrid	Rioja	USADA0584	USADA0492		
5	08/24/00	217241	1.5									LNDD	Charentes	USADA0492	USADA0559	USADA0575	USADA0582
6	08/26/00	217243	0.9									LNDD	Charentes	USADA0492	USADA0559	USADA0575	USADA0582
7	04/01/01	216923	1.1									LNDD	Crit Intern	USADA0492	USADA0559	USADA0575	USADA0582
8	06/26/01	210038	1.1	1.028								LNDD	du Sud	USADA0492	USADA0559	USADA0575	USADA0582
9	06/16/02	176593	1.3	1.023	28	21	1502	1515	27	184	36	LNDD	Dauphine	USADA0582	USADA0492	USADA0559	USADA0575
10	12/08/02	466193	1.1	1.020	16.1	15	1692	1676	45	169		UCLA	OOO	USADA0487	USADA0613	USADA0614	USADA0484
11	07/26/03	808345	1.3	1.018	22	18	848	1267	18	109	17	LNDD	TDF	USADA0582	USADA0492	USADA0559	USADA0575
12	08/15/03	336873	1.5	1.007	84.1	57.3	4111	2951	73.2	392	30	Madrid	Burgos	USADA0584	USADA0492		
13	11/26/03	476315	1.1	1.023	14	14.7	859	1633	37	153		UCLA	OOO	USADA0487	USADA0615	USADA0617	USADA0484
14	02/22/04	277821	1.0	1.011	10.8	10.4	488	415	10.4	21.5		Lisbon	Algarve	USADA0589	USADA0579	USADA0619	USADA0492
15	03/09/04	289130	1.3	1.018	22	19	1429	1436	25	88	35	LNDD	Paris Nice	USADA0582	USADA0622	USADA0492	USADA0559 USADA0575
16	09/04/04	342599	1.7	1.019	25.8	14.5	1761	1902	27.9	143.9	21.6	Madrid	Vuelta Esp	USADA0584	USADA0625	USADA0492	
17	09/11/04	342856	2.0	1.014	7.5	3.7	395	438	5.8	18.4	11.6	Madrid	Vuelta Esp	USADA0584	USADA0628	USADA0492	
18	09/12/04	342850	1.4	1.025	39.9	29.4	2605	2702	32.4	144.9	27.4	Madrid	Vuelta Esp	USADA0584	USADA0631	USADA0492	
19	09/13/04	348369	1.3	1.019	25.5	19.4	1646	1301	22.3	153.1	13.4	Madrid	Vuelta Esp	USADA0584	USADA0634	USADA0492	
20	09/14/04	347883	1.0	1.019	36.2	37.9	2529	1991	32.7	288.7	21.9	Madrid	Vuelta Esp	USADA0584	USADA0637	USADA0492	

	Date	Sample	T/E	SG	Testo	Epi	Andro	Etio	5αDiol	5βDiol	DHEA	Lab	Venue	References			
21	01/08/05	485155	0.8	1.012	17.2	23.8	933	1310	39	98		UCLA	OOO	USADA0487	USADA0640		USADA0484
22	04/21/05	920460	1.5	1.015	11	7	710	697	9	32		UCLA	Georgia	USADA0564	USADA0536	USADA0643	USADA0493
23	04/22/05	920462	1.2	1.025	24	21	1416	1491	30	110		UCLA	Georgia	USADA0564		USADA0645	USADA0493
24	07/17/05	874535	2.2	1.036	32	15	570	576	22	41	15	LNDD	TDF2005	USADA0582	USADA0559	USADA0493	USADA0575
25	10/07/05	491607	1.1	1.026	40.6	41.9	1898	2459	138	435		UCLA	OOO	USADA0487	USADA0651		USADA0484
26	11/05/05	493084	1.1	1.018	29.8	30	1367	1668	75	255		UCLA	OOO	USADA0487	USADA0655		USADA0484
27	01/06/06	493091	0.9	1.025	29.5	33.7	1284	3985	40	253		UCLA	OOO	USADA0487	USADA0478	USADA0659	USADA0484
28	02/22/06	951826	1.8	1.026	28	16	1006	1148	18	86		UCLA	TD CA	USADA0564	USADA0662	USADA0493	
29	02/23/06	951875	1.5	1.022	29	19	1222	1283	20	71		UCLA	TD CA	USADA0564	USADA0664	USADA0493	
30	02/24/06	951828	1.5	1.025	29	20	796	1977	26	137		UCLA	TD CA	USADA0564	USADA0666	USADA0493	
31	02/25/06	951866	1.7	1.025	35	22	1621	2079	38	205		UCLA	TD CA	USADA0564	USADA0668	USADA0493	
32	02/26/06	951872	1.8	1.016	20	12	1106	1359	14	85		UCLA	TD CA	USADA0564	USADA0670	USADA0493	
33	03/08/06	876013	1.5	1.027	65	46	2302	2755	39	202	50	LNDD	Paris Nice	USADA0582	USADA0559	USADA0493	USADA0575
34	03/09/06	874285	1.5	1.022	37	27	1305	1362	26	129	27	LNDD	Paris Nice	USADA0582	USADA0559	USADA0493	USADA0575
35	03/10/06	872364	1.3	1.022	39	31	1302	1696	28	167	27	LNDD	Paris Nice	USADA0582	USADA0559	USADA0493	USADA0575
36	03/11/06	872357	1.6	1.024	61	41	1905	2509	55	308	49	LNDD	Paris Nice	USADA0582	USADA0559	USADA0493	USADA0575
37	03/12/06	876004	1.6	1.016	36	24	1298	1385	28	152	28	LNDD	Paris Nice	USADA0582	USADA0559	USADA0493	USADA0575
38	04/10/06	1504999	1.0	1.024	53.6	53	1525	3745	48	398		UCLA	OOO	USADA0487	USADA0484		
39	04/20/06	951792	2.4	1.025	44	25	1813	2335	24	182		UCLA	Georgia	USADA0564			USADA0493
40	04/21/06	951789	1.8	1.028	52	34	2425	3018	37	139		UCLA	Georgia	USADA0564	USADA0536		USADA0493
41	04/22/06	951787	1.5	1.025	56	43	1781	2308	60	353		UCLA	Georgia	USADA0564	USADA0995		USADA0493
42	04/23/06	951790	1.4	1.025	68	56	845	924	28	161		UCLA	Georgia	USADA0564			USADA0494
43	07/03/06	995462	2.8	1.025	12	4	686	992	17	89	15	LNDD	TDF2006	USADA0405		USADA0494	USADA0415
44	07/11/06	994203	1.3	1.022	17	15	1210	989	20	80	25	LNDD	TDF2006	USADA0405		USADA0494	USADA0422
45	07/13/06	994277	2.5	1.029	24	11	1842	1321	55	100	34	LNDD	TDF2006	USADA0405		USADA0494	USADA0429
46	07/14/06	994276	1.5	1.026	21	17	1594	2041	85	333	28	LNDD	TDF2006	USADA0405	USADA0709	USADA0494	USADA0436
47	07/18/06	994075	1.8	1.022	22	13	1017	823	27	71	34	LNDD	TDF2006	USADA0405		USADA0494	USADA0443
48	07/20/06	995474	4.9	1.026	61	14	1658	1639	97	227	21	LNDD	TDF2006	USADA0405	USADA0375	USADA0494	USADA0454
49	07/22/06	994080	2.5	1.023	23	11	919	771	39	94	22	LNDD	TDF2006	USADA0405	USADA0717	USADA0494	USADA0461
50	07/23/06	994171	1.0	1.026	11	12	802	758	17	51	17	LNDD	TDF2006	USADA0405	USADA0497	USADA0494	USADA0468
51	08/03/06	1501850	1.5	1.006	8	5	532	1284	7	88		UCLA	OOO	USADA0606	USADA0723		IRMS
52	08/21/06	497104	0.9	1.023	73	83	5444	10163	271	870		UCLA	OOO	USADA0606	USADA0729		IRMS

**Table 51. Uncorrected for specific gravity: Landis's longitudinal anti-doping samples. For samples highlighted in yellow, see the notes section on page 311. Bold values have had IRMS. *Italic* values have derivatization problems.**

*Corrected for specific gravity longitudinal data*

	Date	Sample	T/E	SG	Testo	Epi	Andro	Etio	5αDiol	5βDiol	DHEA	Lab	Venue
1	9/8/1999	186671	2									LNDD	L'Avenir
2	9/18/1999	185105	2.1									LNDD	GPdNations
3	1/26/2000	55383	0									Penang	Langkawi
4	4/30/2000	311370	2.1									Madrid	Rioja
5	8/24/2000	217241	1.5									LNDD	Charentes
6	8/26/2000	217243	0.9									LNDD	Charentes
7	4/1/2001	216923	1.1									LNDD	Crit Intern
8	6/26/2001	210038	1.1	1.028								LNDD	du Sud
9	6/16/2002	176593	1.3	1.023	24	18	1306	1317	23	160	31	LNDD	Dauphine
10	12/8/2002	466193	1.1	1.02	16	15	1692	1676	45	169		UCLA	OOO
11	7/26/2003	808345	1.3	1.018	24	20	942	1408	20	121	19	LNDD	TDF
12	8/15/2003	336873	1.5	1.007	240	164	11746	8431	209	1120	86	Madrid	Burgos
13	11/26/2003	476315	1.1	1.023	12	13	747	1420	32	133		UCLA	OOO
14	2/22/2004	277821	1	1.011	20	19	887	755	19	39		Lisbon	Algarve
15	3/9/2004	289130	1.3	1.018	24	21	1588	1596	28	98	39	LNDD	Paris Nice
16	9/4/2004	342599	1.7	1.019	27	15	1854	2002	29	151	23	Madrid	Vuelta Esp
17	9/11/2004	342856	2	1.014	11	5	564	626	8	26	17	Madrid	Vuelta Esp
18	9/12/2004	342850	1.4	1.025	32	24	2084	2162	26	116	22	Madrid	Vuelta Esp
19	9/13/2004	348369	1.3	1.019	27	20	1733	1369	23	161	14	Madrid	Vuelta Esp
20	9/14/2004	347883	1	1.019	38	40	2662	2096	34	304	23	Madrid	Vuelta Esp
21	1/8/2005	485155	0.8	1.012	29	40	1555	2183	65	163		UCLA	OOO
22	4/21/2005	920460	1.5	1.015	15	9	947	929	12	43		UCLA	Georgia
23	4/22/2005	920462	1.2	1.025	19	17	1133	1193	24	88		UCLA	Georgia
24	7/17/2005	874535	2.2	1.036	18	8	317	320	12	23	8	LNDD	TDF2005
25	10/7/2005	491607	1.1	1.026	31	32	1460	1892	106	335		UCLA	OOO
26	11/5/2005	493084	1.1	1.018	33	33	1519	1853	83	283		UCLA	OOO
27	1/6/2006	493091	0.9	1.025	24	27	1027	3188	32	202		UCLA	OOO
28	2/22/2006	951826	1.8	1.026	22	12	774	883	14	66		UCLA	TD CA
29	2/23/2006	951875	1.5	1.022	26	17	1111	1166	18	65		UCLA	TD CA
30	2/24/2006	951828	1.5	1.025	23	16	637	1582	21	110		UCLA	TD CA

	Date	Sample	T/E	SG	Testo	Epi	Andro	Etio	5 $\alpha$ Diol	5 $\beta$ Diol	DHEA	Lab	Venue
31	2/25/2006	951866	1.7	1.025	28	18	1297	1663	30	164		UCLA	TD CA
32	2/26/2006	951872	1.8	1.016	25	15	1383	1699	18	106		UCLA	TD CA
33	3/8/2006	876013	1.5	1.027	48	34	1705	2041	29	150	37	LNDD	Paris Nice
34	3/9/2006	874285	1.5	1.022	34	25	1186	1238	24	117	25	LNDD	Paris Nice
35	3/10/2006	872364	1.3	1.022	35	28	1184	1542	25	152	25	LNDD	Paris Nice
36	3/11/2006	872357	1.6	1.024	51	34	1588	2091	46	257	41	LNDD	Paris Nice
37	3/12/2006	876004	1.6	1.016	45	30	1623	1731	35	190	35	LNDD	Paris Nice
38	4/10/2006	1504999	1	1.024	45	44	1271	3121	40	332		UCLA	OOO
39	4/20/2006	951792	2.4	1.025	35	20	1450	1868	19	146		UCLA	Georgia
40	4/21/2006	<b>951789</b>	1.8	1.028	37	24	1732	2156	26	99		UCLA	Georgia
41	4/22/2006	951787	1.5	1.025	45	34	1425	1846	48	282		UCLA	Georgia
42	4/23/2006	951790	1.4	1.025	54	45	676	739	22	129		UCLA	Georgia
43	7/3/2006	<b>995462</b>	2.8	1.025	10	3	549	794	<b>14</b>	71	12	LNDD	TDF2006
44	7/11/2006	994203	1.3	1.022	15	14	1100	899	18	73	23	LNDD	TDF2006
45	7/13/2006	<b>994277</b>	2.5	1.029	17	8	1270	911	38	69	23	LNDD	TDF2006
46	7/14/2006	994276	<b>1.5</b>	1.026	16	<b>13</b>	1226	<b>1570</b>	<b>65</b>	<b>256</b>	22	LNDD	TDF2006
47	<b>7/18/2006</b>	994075	1.8	1.022	20	12	925	748	25	65	31	LNDD	TDF2006
48	7/20/2006	<b>995474</b>	4.9	1.026	47	11	1275	1261	75	175	16	LNDD	TDF2006
49	7/22/2006	<b>994080</b>	2.5	1.023	20	10	799	670	34	82	19	LNDD	TDF2006
50	7/23/2006	994171	1	1.026	8	9	617	583	13	39	13	LNDD	TDF2006
51	8/3/2006	<b>1501850</b>	1.5	1.006	27	17	1773	4280	23	293		UCLA	OOO
52	8/21/2006	<b>497104</b>	0.9	1.023	63	72	4734	8837	236	757		UCLA	OOO

Table 52. Corrected for specific gravity: Landis's longitudinal anti-doping samples. For **samples highlighted in yellow**, see the notes section on page 311. **Bold** values have had IRMS. *Italic* values have derivatization problems.

## Notes

I count 52 tests.

The UCI summarizes the tests, incompletely (often with 0 for an unreported value) on USADA0492 through USADA0494.

Samples commented on below are highlighted in yellow in Table 51.

## Inconsistencies

Throughout the discovery documents, USADA often makes several repeated requests to the labs for records. Labs often report results more than once.

*Inconsistencies or errors in T/E ratios and dates are found only in reports from LNDD:*

- 176593 sample is reported as 1.3 on USADA0582 and reported as 1.2 on USADA0492, USADA0559, and USADA0575.
- 289130 sample is reported as 1.3 on USADA0582 and reported as 0.9 on USADA0492, USADA0559, USADA0575, and USADA0622.
- 808345 sample is reported as 1.3 on USADA0582 and reported as 0.9 on USADA0492, USADA0559, and USADA0575.
- 994075 sample is incorrectly reported as having been acquired on July 15, 2006 on USADA0405. The stage took place on July 18, 2006.
- 994276 sample is reported as 1.5 on USADA0405 and reported as 2.0 on USADA0506 and USADA0709.

There are two values reported for epitestosterone: 17 on LNDD0011, associated with a T/E of 1.5; and 24 on LNDD0012 with an overwritten, handwritten T/E of 2.0—which appears high given the measured amounts of T (21.5) and E (24.2).

- 995474 sample is reported as 4.9 on USADA0405, 11 on USADA0390, and as 11.4 on USADA0375. The reported value on USADA0494 is hard to read, 11.?

951789 sample from UCLA is listed on USADA0564, USADA0493, and USADA0693. It is listed as 951786 on USADA0536.

## Tour de France 2006

- Tour de France 2006 values from the LNDD are tabled on USADA0405 and USADA0410.
- Both tables list the T/E for sample 995474 as 4.9.
- 994276 sample was reported as suspicious for etiocholanolone and the diols on USADA0404.
- 995462 sample has a 5 $\alpha$ 3a diol value of 14 listed on USADA0415 and a value of 17 listed on USADA0405.
- 995474 values in LNDD tables are a mélange of values obtained in the first (incomplete derivatization) screening and the rescreening. There is some note of this on the table on USADA0410, but not on the table at USADA0405.
- 994277, 995474, and 994080 (at least three LNDD samples from the Tour de France 2006) had derivatization problems, although these problems were not always reported on the longitudinal data files. These are in ***bold italics***.

## IRMS

At least 3 IRMS studies were performed.

These samples numbers are in **bold**:

- 995474, the index sample, Stage 17 TDF, at LNDD.  
497104 and 1501850, two out-of-competition post-Tour samples performed at UCLA.<sup>410</sup>

## Other Notes

- 497104 sample data for androsterone, etiocholanolone, and diols are unreliable, according to the lab. (USADA0606 and USADA0607.)
- 874535 sample had a derivatization problem noted on USADA0581, USADA0582, and USADA0647.

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<sup>410</sup> The diol test was not performed on 1501850 because measured values were low.  
Paul Scott: There are no absolute cutoff values. They are intentionally left flexible so that a decision can be made on a case-by-case basis. A rule of thumb, however, is that androstenediol levels below 25 ng/mL would lead to the decision to do A/E.

The reason for the flexibility is to leave it just at a judgment call based on a variety of influencing factors, the two most significant of which are diol concentration and sample volume remaining. For particularly low volume urine, diol levels considerably higher than 25ng/ml could still lead to a decision to do A/E.

The effect of making the wrong call is wasting urine (and time and money) on a diol assay that produces unusable results.

# Appendix G: Test Procedures and Problems

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## The Tests

### Gas Chromatography (GC)<sup>411</sup>

Gas chromatography (GC) is a method used to separate and quantify different compounds.

A vaporized sample composed of a mixture of known or unknown compounds is injected into one end of a column (a long, thin, coiled tube) along with gas being forced through it.

Different compounds move along at different rates based on (1) their weight and shape and (2) the column's characteristics.

A detector at the end determines the quantity of each compound injected as it arrives. This arrival time, or retention time, can be used to help identify different compounds in an unknown sample.

In a chromatogram, retention time is plotted on the X-axis. Signal response height is plotted on the Y-axis. The signal response is created by the analyte(s) exiting the system. Generally, the signal is proportional to the concentration of the specific analyte separated.

A chromatogram looks a lot like the course profile of a mountain stage in the Tour de France, with many "peaks" separated by valleys.

Each peak consists of a substance or group of substances that share the same retention time.

Read more about chromatograms on page 316.

Read more about retention time on page 317.

Find a glossary of testing terms on page 329.

### Mass Spectrometry (MS)

Mass spectrometry (MS) is another method used to identify compounds.

The mass spectrometer sends an electron beam through the molecules that splits them apart and gives each piece an electric charge. This process creates a set of charged molecular fragments, or ions.

The ions are then accelerated down a tube, and their course is altered with a magnet as they travel. The lighter ions are moved more by the magnet than are the heavier ions. This information can be used to exactly quantify the atomic weight of ionized fragments.

The kinds (molecular weights) and relative amounts of the ions that are formed from a particular substance are reproducible for a pure substance, creating a kind of molecular "fingerprint" that uniquely identifies a given compound.

### GC/MS

A mass spectrometer can be used as the detector in a gas chromatograph, creating a specific method of identifying and quantifying compounds in an unknown sample.

The effluent gas from the GC is fed into the MS. The amount of any of a number of different ions can be continuously monitored.

When properly performed and interpreted, this allows the analyst to identify particular "peaks" in the chromatogram.

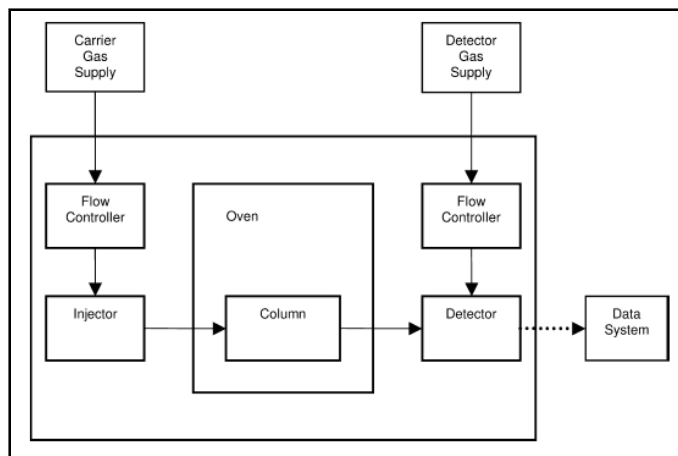
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<sup>411</sup> Adapted from the Landiscase Wiki. <http://landiscase.wikispaces.com/GC+IRMS>. Accessed Jan 12, 2007.

## Basic Parts of a Gas Chromatograph<sup>412</sup>

The major components of a gas chromatographic system are: gas supply, flow controllers, injector, capillary column, oven, detector, and a data system (see Figure 195).

In most cases, the injector, detector, and oven are integral parts of the gas chromatograph. The column, gases, and recording device are separate items and may be supplied by a different manufacturer.



**Figure 195.** Block diagram of a typical gas chromatograph. Solid arrows denote gas flow paths and dotted arrows denote electronic signal flow paths. From Rood, 2007.

### Gas Supply and Flow Controllers

High purity gases are supplied from a pressurized cylinder or gas generator.

Pressure regulators on the cylinders or generators control the amount of gas delivered to the gas chromatograph.

Flow controllers or pressure regulators in the gas chromatograph control the flow of the various gases once they enter the instrument.

The column is installed between the injector and detector.

Gas at a precisely controlled flow is supplied to the injector. This gas is called the carrier gas. The carrier gas flows through the injector and into the open tubular column. The gas travels the length of the column and exits through a detector.

To function as desired, most detectors require specific gases at the proper flow rates.

### Injector

The injector introduces the sample into the open tubular column.

The injector is a hollow, metal cylinder containing a glass liner or insert. The column is inserted into the bottom of the injector so that the column end resides in the lower region of the glass liner.

A liquid, or sometimes a gas, is introduced into the injector through a resealable septum using a small syringe.

The injector is heated to between 100°C and 300°C. Volatile sample components are rapidly transformed into a vapor. The carrier gas mixes with the vaporized portion of the sample and carries the sample vapors into the column.

An on-column injector deposits the sample directly into the column without a vaporization step and it is used for select types of samples.

### Capillary Column and Oven

The column resides in an oven whose temperature is accurately controlled.

If unimpeded, vaporized compounds move through the column at the same rate as the flowing carrier gas.

However, the interior walls of columns are coated with a thin film of polymeric material called the stationary phase. This stationary phase impedes the movement of each compound down the column by a different amount. This behavior is called retention.

<sup>412</sup> Adapted from Rood, D. *The Troubleshooting and Maintenance Guide for Gas Chromatographers*, Wiley. Fourth Edition. (2007). Minor editing.



The length and diameter of the column, the chemical structure and amount of the stationary phase, and the column temperature all affect compound retention.

Ideally, if all of these factors are properly selected, each compound travels through the column at a different rate. This makes the compounds exit the column at different times. As each compound leaves the column, its presence and amount are measured by the detector.

Any compounds that travel through the column at the same rate are not separated and have the same retention times.

### ***Detector***

As each compound exits the column, it enters the detector. The detector interacts with the compounds based on some physical or chemical property. Some detectors respond to every compound while others respond only to a select group of compounds. The interaction generates an electrical signal whose size corresponds to the amount of the compound. The detector signal is then sent to a recording device for plotting.

### ***Data System***

A recording device plots the size of the detector signal versus the time elapsed since sample introduction into the injector. The plot is called a chromatogram and appears as a series of peaks.

Most common data recording devices are computer (PC) based. PC based data system offer data plotting, reporting and storage options. Most computer-data systems can also control and automate the operation of the GC.

## The Chromatogram

In the ideal situation, each peak in the chromatogram represents a single compound in the sample.

It is not unusual for more than one compound in a sample to interact with the column in the same manner, thus each compound has the same retention. This results in a single peak that represents more than one compound (complete co-elution).

In some cases, the interactions are very similar, but not identical. This results in two peaks that partially overlap (partial co-elution).

Proper column and operating conditions minimize dual peak identities or overlapping problems, but there are cases where complete separation is not possible.

Each peak in the chromatogram is assigned a retention time. It is the time required for a compound to travel through the column. The data system usually calculates and prints the retention times and size for each peak on the chromatogram or in a table. Retention times are usually reported in minutes and the peak size in an unitless area or height value.

Identifying the compounds corresponding to each peak in the chromatogram is accomplished by comparison to a previously generated reference chromatogram. A prepared solution containing known amounts of each compound (commonly called a standard) is analyzed to obtain their respective retention times and peak sizes.

Using the same column and GC parameters, the sample is analyzed.

If the peaks in the sample do not correspond to those in the standard, the sample does not contain any of the compounds.

If any of the peaks in the sample have the same retention times as those in the standard, the sample may contain one or more of the compounds.

The size of a peak is proportional to its amount in the sample or standard. To determine the amount of a compound in the sample, the size of its peak (generally peak area, sometimes peak height) is used.

Since the standard contains a known amount of each compound, the standard's peak sizes can be used as a reference. The size of the peak in the sample is compared to the size of the corresponding peak in the standard. A simple ratio is set up for quantitation.

For example, if the peak in the sample is two times larger than the peak in the standard, the injected portion of the sample contains two times the amount of the compound than the amount known to be present in the standard.

There are numerous situations where peak misidentification or quantitation errors can occur. Adhering to good GC practices minimizes the occurrence of these types of errors.

## Retention Time Parameters

### Retention Time

The gas chromatographic *retention time* can be used as a property to characterize the compound, because *under constant chromatographic conditions, the retention time of a compound is reproducible*.

Identification based on retention times relies on knowing which compound elutes at a certain retention time, i.e. you compare the observed retention time of your sample with a table of previously recorded retention times.

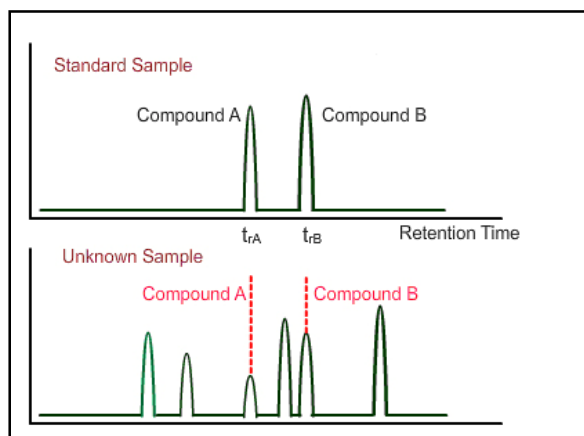


Figure 196. Based on retention time alone, compounds 'A' and 'B' of the standard sample *may* be present in the unknown sample.

As already noted, different compounds might coincidentally coelute at the same retention time, which somewhat limits the scope of gas chromatography and gives rise to the need of more enhanced analytical methods like GC/MS.

A major problem of the retention time based approach of identifying compounds is *the necessity of maintaining "exactly identical chromatographic conditions."*

A subtle temperature difference of 1°C, a slightly increased carrier gas pressure, or a few seconds of delay when starting the acquisition may cause retention time deviations larger than the retention time range of several possible compounds.

System maintenance—like shortening the column or installing a new column—will change the retention times and require all reference retention times to be measured again. Routinely, references and samples are run in the same sequence shortly after each other.

*It is not possible with the required degree of accuracy to compare the retention times of one GC with another system, neither in the same laboratory nor worldwide.*

In summary, retention times are valuable information to characterize and identify compounds, but they are poorly reproducible long-term or between different systems and should only be relied on when measuring reference and sample *under identical conditions and shortly after each other*.

### Relative Retention Time

One approach to overcome some of the limitations of (absolute) retention time is to calculate *relative retention time*. That is, divide the retention time of a compound by the retention time of a known standard.

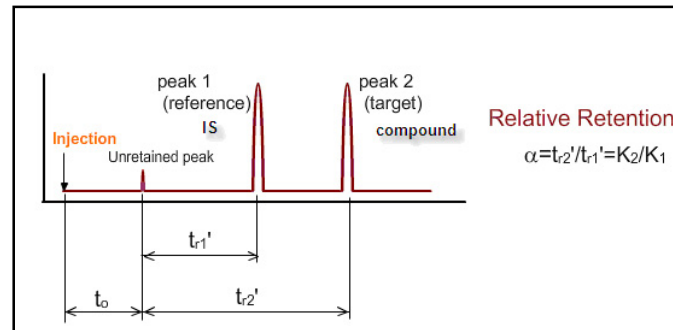


Figure 197. Depiction of relative retention time.

With relative retention times, slight variations of temperature, for example, can be compensated—because they have equal effect on both compounds. Relative retention times are to a certain degree comparable even between different systems.

However, delays or entirely different temperature programs cannot be compensated with this method.

Further, the larger the retention time difference between internal standard and target compound, the less accurate is this kind of compensation.

### Retention Index

Some limitations of retention time and relative retention time can be resolved by calculating relative retention times based on *two* internal standards, one shortly eluting before and the other shortly eluting after the target compound.

Many standards may be necessary to cover the complete time range.

The difference between the retention times of two consecutive standards is divided in 100 parts. The *retention index (RI)* of a standard itself is defined as 100n.

For many analyses, retention indices are normalized retention times relative to n-alkanes.

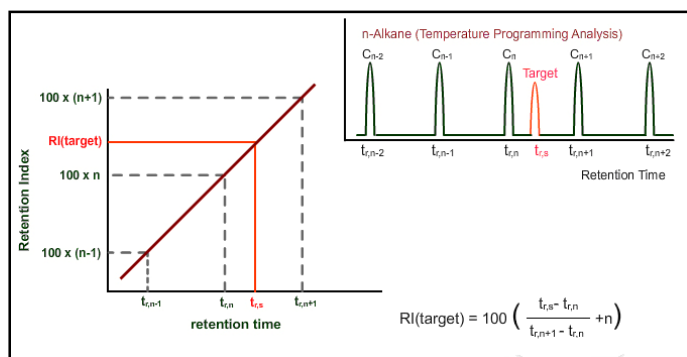


Figure 198. Depiction of retention index.

By using retention indices instead of absolute retention times, one gains independence from instrumental conditions such as carrier gas pressure or column length. Retention indices are comparable using different GC/MS instruments.

The retention index is dependent on the kind of stationary phase. Different stationary phases give rise to different retention indices of the same compound. Therefore, the type of stationary phase should always be given when stating retention indices.

Retention indices are independent from:

- Delay of acquisition (absolute shift of time axis) has no influence on RI
- Unit of time measurement has no influence on RI
- Isothermal and linear temperature variations have no influence on RI
- Carrier gas pressure and flow rates have no influence if held constant during one measurement
- Column length has no influence on RI
- Column diameter, stationary film thickness and pre-columns have no influence on RI

### Melding GC/MS and Retention Index

In GC/MS technique the “GC” and the “MS” part are independent. Different substances with identical chromatographic retention times usually exhibit different mass spectra.

In other words, coeluting peaks only rarely give rise to identical mass spectra.

Using retention indices in GC/MS significantly increases the reliability of peak identifications by providing a second, independent experimental value.

## Isotope Ratio Mass Spectrometry

GC-Combustion-Isotope Ratio Mass Spectrometry (GC/C-IRMS, IRMS, or CIR) identifies the relative amounts of carbon-13 ( $^{13}\text{C}$ ) and carbon-12 ( $^{12}\text{C}$ ) in a particular substance (here, metabolites of testosterone).

The first step in this analytical technique is gas chromatography. This is followed by complete combustion of the carbon-bearing substances in the GC effluent, producing  $\text{CO}_2$  and water.

The water is removed from the effluent stream, and the mass spectrum of the  $\text{CO}_2$  is measured.

The amount of  $\text{CO}_2$  containing  $^{13}\text{C}$  (molecular weight of 45) can be compared to the amount of  $\text{CO}_2$  containing the more common  $^{12}\text{C}$  (molecular weight of 44).

This technique may identify the source of testosterone metabolites found in an athlete's urine. Sample preparation and instrument calibration are complex.

### ***Background: Explanation of the CIR Method in Doping Control***<sup>413</sup>

**Atoms and Molecules.** Everything in nature is made of molecules and most molecules are made of atoms of carbon, hydrogen, and oxygen. Atoms are nature's building blocks and carbon is a very dominant atom in the human body.

**Food-Chain.** The human food-chain begins with plants. Plants get their carbon by photosynthesis—they take in or “fix” the carbon dioxide in the air. Animals eat plants. Many humans eat plants and animals. Vegetarians eat only plants. Ultimately, all carbon atoms in the human body are derived from the carbon dioxide in the air.

**The Instrument.** Most of the carbon all around is  $^{12}\text{C}$  (carbon 12), but a small amount is  $^{13}\text{C}$ , a different isotope, heavier by one extra neutron. Roughly 1.1% of all carbon is  $^{13}\text{C}$ , but different compounds contain more or less  $^{13}\text{C}$ .

These small differences in  $^{13}\text{C}$  content can be measured with an instrument known as GC/C-IRMS. The GC/C-IRMS is designed to determine differences in the ratio of  $^{13}\text{C}$  to  $^{12}\text{C}$  in biological molecules such as testosterone, its precursors, and its metabolites. The units of measurement are called delta units ( $\delta$ ).

**Nature's Label.** Through a fortuitous quirk of nature, there is a measurable difference in  $^{13}\text{C}$  content between biosynthetic and pharmaceutical testosterone. This is because they arise from different pathways. Biosynthetic testosterone is made in the human body from cholesterol. Pharmaceutical testosterone is synthesized from plant products (soy and others). It contains less  $^{13}\text{C}$  than natural or endogenous testosterone, therefore its  $^{13}\text{C}/^{12}\text{C}$  ratio is lower. By measuring just how much lower, if at all, the GC/C-IRMS method determines whether the testosterone is from pharmaceutical or endogenous sources. Urinary steroids with a low delta value originate from pharmaceutical steroids.

**Role of Steroid Metabolism.** Endogenous testosterone is biosynthesized from cholesterol via a complicated pathway which can be abbreviated as cholesterol  $\rightarrow$  pregnenolone  $\rightarrow$  progesterone  $\rightarrow$  androstenedione  $\rightarrow$  testosterone.

After testosterone is biosynthesized, it is metabolized or broken down to DHT, androsterone, etiocholanolone,  $5\alpha$ -diol and  $5\beta$ -diol. All these, steroids appear in human urine. If an individual takes pharmaceutical testosterone, the testosterone in the urine will be labeled with a low  $^{13}\text{C}/^{12}\text{C}$  ratio and so will all the metabolites of testosterone. Thus by determining the  $^{13}\text{C}/^{12}\text{C}$  ratio of urine  $5\alpha$ -diol and  $5\beta$ -diol (testosterone metabolites), the test is determining whether the metabolites came from natural or pharmaceutical testosterone.  $5\beta$ -pdol is not involved in testosterone metabolism, therefore it is not affected by taking testosterone, and that makes it a good endogenous reference compound (ERC).

Note: For a diagram of steroid pathways, see Figure 179.

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<sup>413</sup> Catlin, DH. UCLA Olympic Analytical Laboratory. USADA0479. Minimal formatting, but no substance-editing.

## The Problems

### Good Chromatography

As discussed throughout this book, good chromatography is essential for accurate analysis.

Good chromatography, as we will see, includes well-separated peaks, a lack of matrix interference, and level baselines.

“Reliable isotope ratio results are obtained when GC/C-IRMS peaks are strong and cleanly resolved from other peaks.”

“Precision is no assurance of accuracy, particularly in continuous-flow IRMS.”<sup>414</sup>

“Problems are encountered when peaks are close together or slightly overlapping, are of small signal, or appear on curved baselines.”<sup>415</sup>

“Characterization of peak envelope—width, height, resolution, shoulders, asymmetry—and development of criteria for acceptable peak characteristics are important.”<sup>416</sup>

The bottom line point emphasized at USADA’s 2<sup>nd</sup> Annual Symposium on IRMS:<sup>417</sup>

***“Well separated peaks with good symmetry are important to analysis.”***

***Bad chromatography characterizes the work at LNDD.***

- Peaks are not well separated.  
Many peaks co-elute or overlap.
- Many peaks are poorly shaped.  
For example, many have long trailing tails.
- Baselines are not level.  
Downward sloping baselines are common.

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<sup>414</sup> Brenna, T. Effects of Chromatographic Overlap on Uncertainty. 2<sup>nd</sup> Annual USADA Symposium on Anti-Doping Science. Application of Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry to Doping Control. Los Angeles. Page 77. (2003). USADA0882. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>415</sup> Brenna, T. Effects of Chromatographic Overlap on Uncertainty. 2<sup>nd</sup> Annual USADA Symposium on Anti-Doping Science. Application of Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry to Doping Control. Los Angeles. Page 76. (2003). USADA0882. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>416</sup> Uncertainty in GC/C-IRMS Measurement as Applied to Doping Control. 2<sup>nd</sup> Annual USADA Symposium on Anti-Doping Science. Application of Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry to Doping Control. Los Angeles. Page 87. (2003). USADA0882. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

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<sup>417</sup> Uncertainty in GC/C-IRMS Measurement as Applied to Doping Control. 2<sup>nd</sup> Annual USADA Symposium on Anti-Doping Science. Application of Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry to Doping Control. Los Angeles. Page 87. (2003). USADA0882. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

## Basic Identification Problems

### Problem: Ion Mass

The mass (colloquially, weight) of an analyte or analyte fragment is only one characteristic of that substance.

Many substances and fragments can and do share the same ion mass.

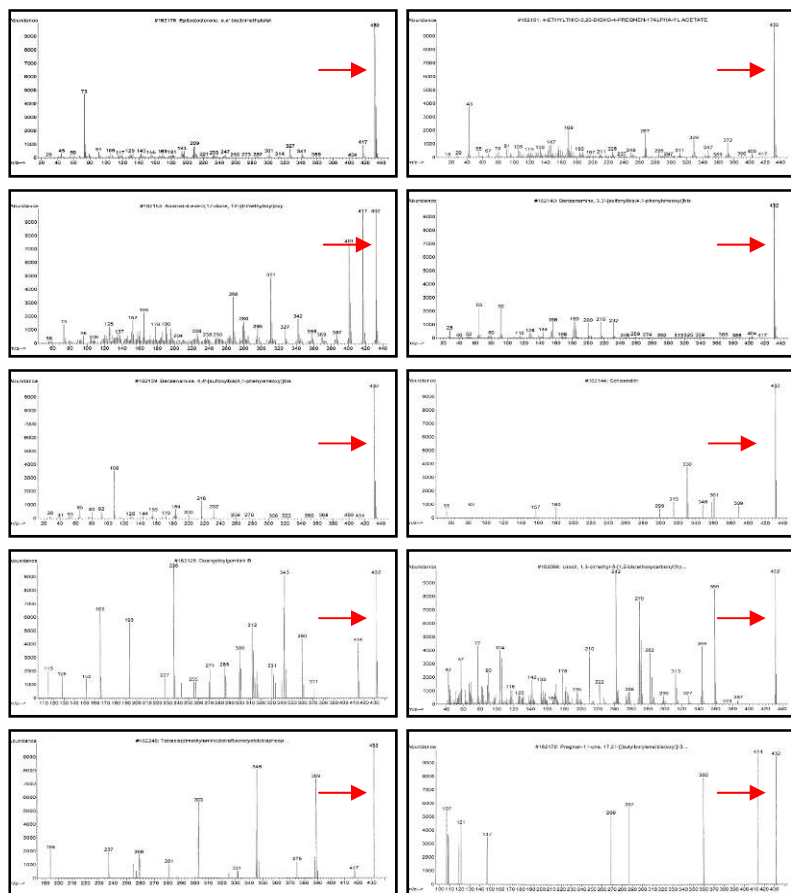


Figure 199. Many substances share the same 432 ion mass as testosterone.

### Problem: Retention Time

The arrival time, or retention time, of a substance at a detector is only one characteristic of the substance.

Many substances can and do share the same retention time.

### Problem: Matrix Interference: Overlapping Peaks

At the heart of the GC/MS and GC/C-IRMS analytical methods is gas chromatography (GC) which is used to separate a complex mixture of volatile substances into its respective components.

This technique is not perfect. An example of one kind of problem that can arise when the separation is not complete is shown in Figure 200.

In these figures, the blue peak has twice as much material as the red peak.

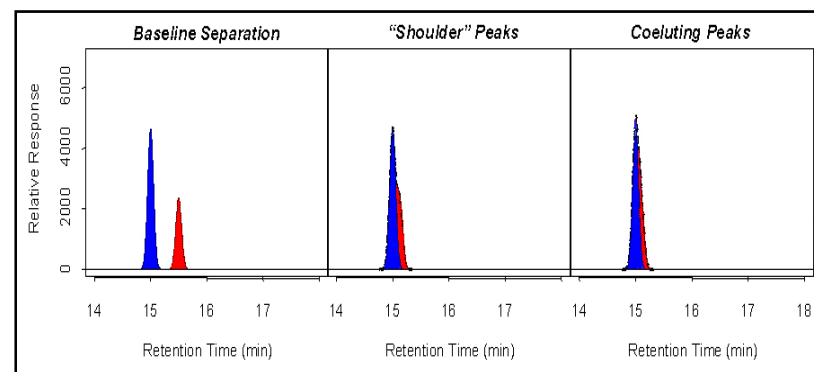


Figure 200. GC separation. Left figure shows satisfactory separation. Middle and right figures show incomplete separation: shoulders and coelution.

A successful separation is illustrated in the left-hand figure, where the red and blue peaks are clearly resolved by about 0.5 minute.

The middle and right-hand figures illustrate what can happen when the separation is not complete.

## GC/MS

In each of these cases, the quantification of the apparent peak would (erroneously) be based on the area under the black dashed line representing a composite of the blue and red peaks.

If the substance of interest is represented by the red peak, then this will result in a 300% overestimate of the true amount of the substance of interest. If the blue peak were of interest, then the interference would result in a 50% overestimate.

In both cases, there is a substantial inaccuracy introduced by the interfering substance.

If the amount of an interfering substance is small relative to the substance of interest, it may have little effect on the true quantity of interest. However, sometimes there is significant interference.

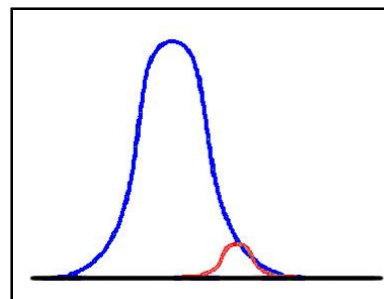
WADA criteria—WADA TD2003IDCR<sup>418</sup>—require that the T/E ratio be verified on the basis of three diagnostic ions, and quantification based on each of these ions needs to agree within 20%.

## GC/C-IRMS

For GC/C-IRMS, it is critical that an excellent GC separation be achieved to ensure that the carbon whose isotope ratio is being measured is derived *only* from the substance of interest, and not from a mixture of substances.

Whereas in GC/MS if the red peak is small, say 5% of the blue peak, and it is the blue peak that is of interest, then the quantification of blue peak may be overestimated by just 5%.

In GC/C-IRMS, the delta value is being calculated, and even though the red peak may be only 5% of the area of the blue peak, it may have a completely different delta value and therefore make interpretation of the delta value of the blue peak impossible.



**Figure 201.** Even though the area under the red curve may represent only 5% of the total area, it may throw off an IRMS reading by more than 30 delta units.

Although in nature, and in the case of Landis, we may be looking at values of about -28‰ delta units, fragmentation of compounds may yield small peaks with values as low as -700‰ delta units. Such a compound would change the measured value a total of more than 32 delta units to -61.6‰ delta units. Even a -70‰ delta unit fragment would result in more than a 2 delta unit shift.

### Wolfram Meier-Augenstein's comment:

For this reason good GC separation is not good enough (good = 10% valley). For GC/C-IRMS, particularly in forensic applications, baseline separation between peaks (compounds) of interest must be achieved. (The exception to this is with the use of software tools for deconvoluting overlapping GC/C-IRMS peaks, such as those of Tom Brenna. These are not commonly employed).

<sup>418</sup> WADA TD2003IDCR. 1. (2003). Identification criteria for qualitative assays incorporating chromatography and mass spectrometry. [http://www.wada-ama.org/rtecontent/document/criteria\\_1\\_2.pdf](http://www.wada-ama.org/rtecontent/document/criteria_1_2.pdf). Accessed Dec 28, 2006.



**Problem: Peak Integration: Peak Overlap**

A GC/C-IRMS  $\text{CO}_2$  peak is composed of a  $^{12}\text{CO}_2$  peak (usually shown in the chromatograms) and a  $^{13}\text{CO}_2$  peak (usually not shown).

These two peaks do not coincide in time; the  $^{13}\text{CO}_2$  (mass 45) precedes the  $^{12}\text{CO}_2$  (mass 44).

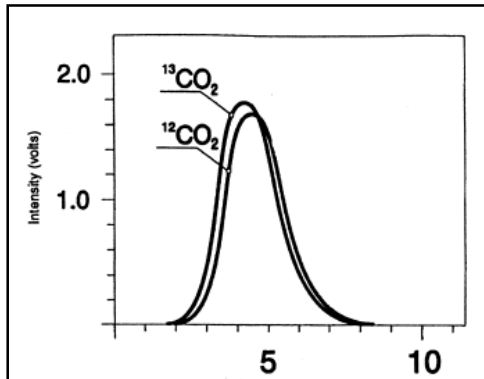


Figure 202. The carbon-13 peak elutes earlier than the carbon-12 peak.

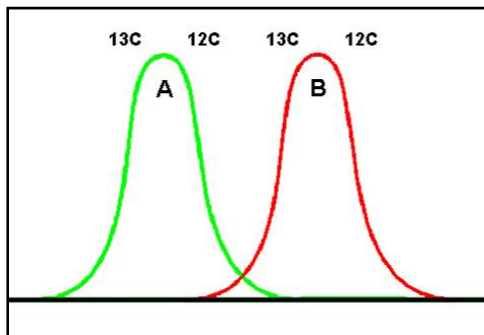


Figure 203. When peaks overlap, isotopic values may be skewed.

Peak overlap (poor peak resolution) results in  $^{13}\text{CO}_2$  from peak 'B' becoming part of peak 'A' and too positive a  $\delta^{13}\text{C}$  value for peak 'A' being reported.

Peak overlap also results in  $^{12}\text{CO}_2$  from peak 'A' becoming part of peak 'B' and too negative a  $\delta^{13}\text{C}$  value for peak 'B' being reported.

**Problem: Peak Integration: Manual Peak Start and Stop**

As noted above, the GC/C-IRMS CO<sub>2</sub> peak is composed of a <sup>12</sup>CO<sub>2</sub> peak (usually shown in the chromatograms) and a <sup>13</sup>CO<sub>2</sub> peak (usually not shown).

These two peaks do not coincide in time; the <sup>13</sup>CO<sub>2</sub> (mass 45) precedes the <sup>12</sup>CO<sub>2</sub> (mass 44).

This time displacement gives rise to the Z-shaped 45/44 ratio signal.

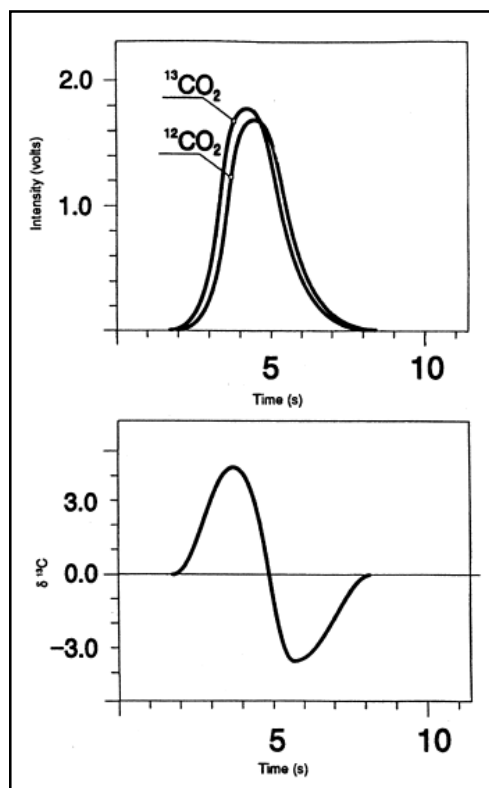


Figure 204. The 45/44 ion ratio signal derives from the asynchrony of the carbon-13 and carbon-12 peaks. The ion ratio signal may help an analyst choose a manual peak start and stop.

Choosing peak stops and starts manually often requires sophistication and many years of experience.

The 45/44 ion ratio signal may help in manually selecting a peak start and a peak stop (this process is usually automated).

As IRMS instrument specialist Simon Davis showed at Landis's arbitration, it is crucial to include the whole peak of both the chromatographic and ion ratio traces in processing the data. Since the beginning and tail of each peak may represent quite different delta values, minor errors in selecting the peak start and peak stop may result in changes of more than 10 delta units.

This issue becomes even more of a problem when peaks are not separated, as occurred frequently in Landis's analyses.

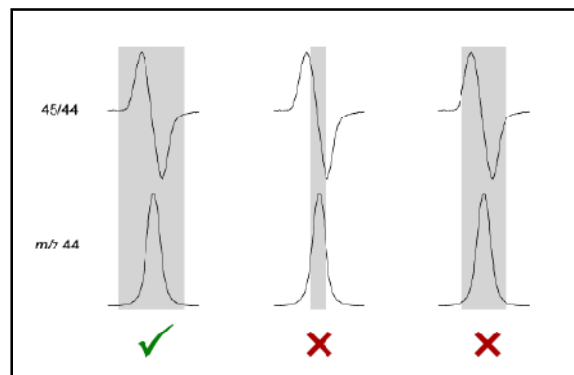


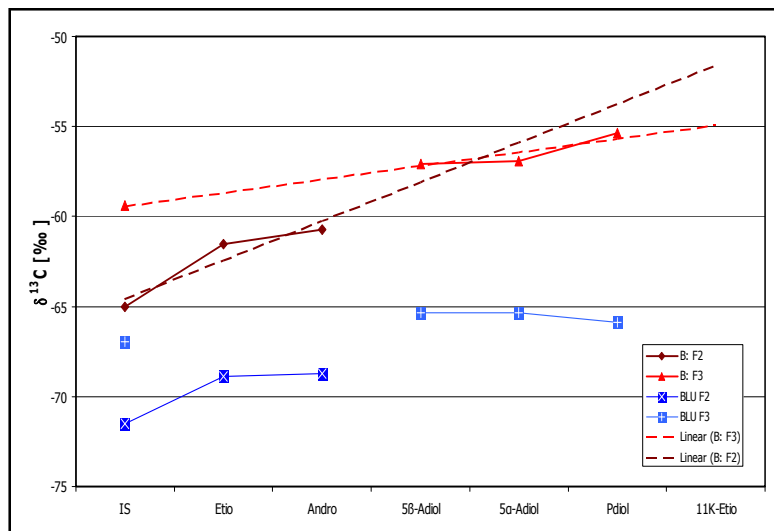
Figure 205. In manually selecting peak start and peak stop, the operator must include the whole peak of both the ion ratio trace (above) and chromatogram (below) in order to obtain an accurate result.

### ***Problem: Peak Integration: Manual Baseline Selection***

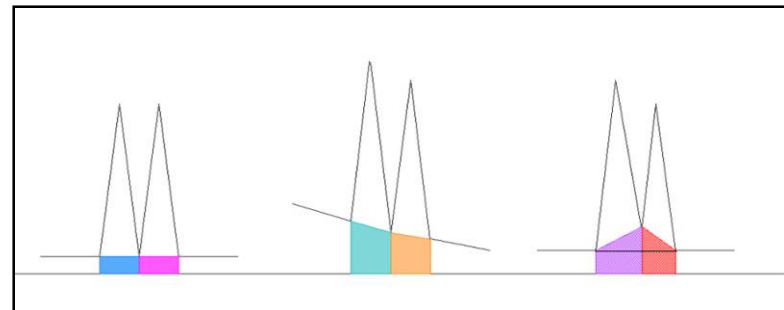
As noted above, choosing peak stops and starts manually often requires sophistication and many years of experience.

Manually selecting baseline points is fraught with even more difficulty—so much so that most IRMS programs do not allow the operator to manually choose baseline points.

As IRMS Instrument specialist Simon Davis showed at Landis's AAA hearing, manually selecting baseline reference points may result in changes of more than 50 delta units. Even points that appear “almost perfect” may yield values as many as 10 delta units different, especially in the setting of sloping baselines or overlapping peaks.



**Figure 206.** The background delta value of the ‘B’ sample 5α-Adiol is about -57 delta units.



**Figure 207.** Manually selecting baseline points for level baselines with well-separated peaks, as on the left, is relatively easy. Manually selecting baseline points for sloping baselines (center) or overlapping peaks (right) is problematic.

***Problem: Pattern Recognition Matching Inadequate***

Without proper internal standard anchoring and accurate relative retention times, the LNDD appears to rely on crude pattern recognition for analyte identification.

The inadequacy of this method is demonstrated simply by looking at their Mix Ac 50, one example of which is shown in Figure 208.

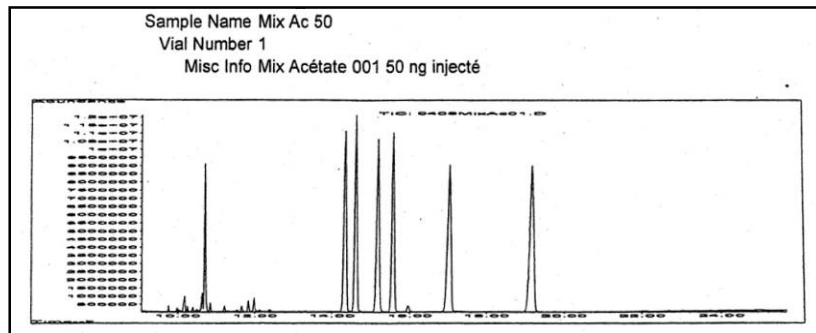


Figure 208. USADA0301. Mix Ac 50 by LNDD on GC/MS. This crude chromatographic pattern of this mix of acetylated testosterone metabolites is similar to that of an almost random mix of amino acids, as shown in Figure 209, a mix that has no relationship to the target compounds.

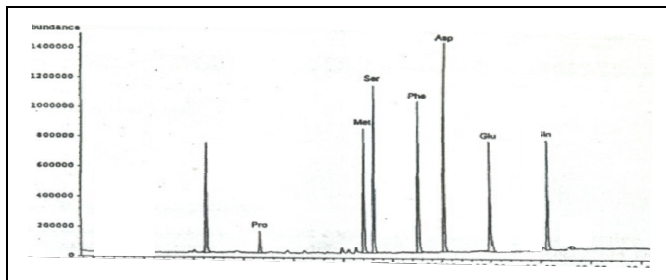


Figure 209. A TMS-derivatized amino acid mix on GC/MS. This mix, the overall chromatogram of which superficially resembles the retention times of the Mix Ac 50 shown in Figure 210, has no relationship to those testosterone metabolites.

Wolfram Meier-Augenstein's comment:

This would make for a nice challenge to LNDD on the subject of how they identify the peaks in their GC/C-IRMS chromatograms considering the relative retention times.

## Driveway/Leaf Blower

### Analogy

In some ways, laboratory identification of substances is like a leaf blower on a driveway.

Think of a driveway, leading up to a garage door that is slightly uphill.

Imagine you have a variety of materials—stones, leaves, grass clippings—at the bottom of the driveway.

You turn on a leaf blower, and blow all the materials to your garage door.

Other things being equal, the lighter objects arrive first.

Other things being equal, the smoother objects, with less rolling resistance arrive first.

Other things being equal, the objects with greater aerodynamic drag catch the air and arrive first.

It is not possible to determine the identification of a material based solely on the time it takes to arrive at the garage door:

For example: A lighter object, with rough surfaces might arrive as the same time as a heavier object with smooth surfaces.

### Predicting the Tour de France Winner Analogy

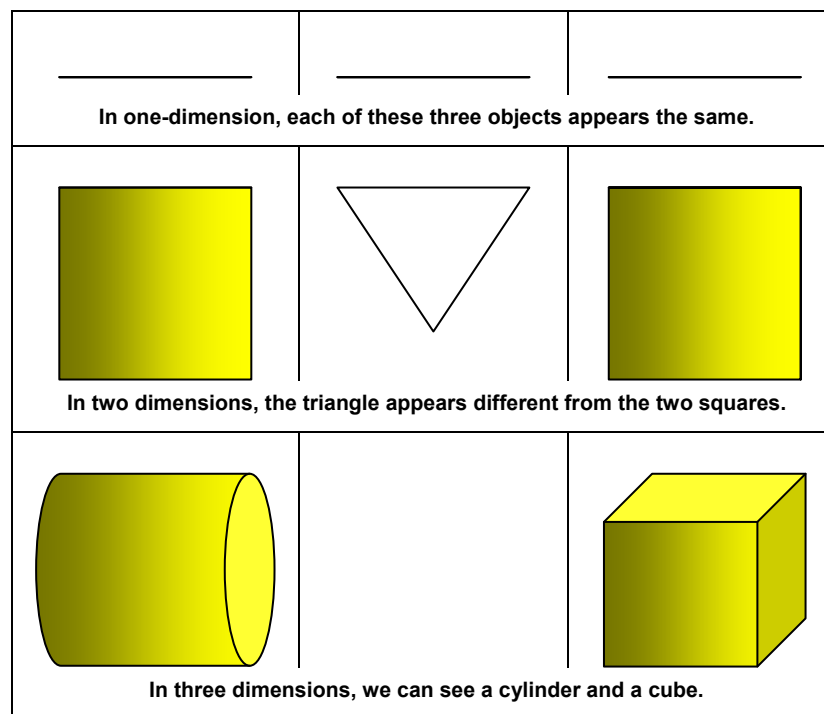
Suppose you try to predict the next Tour de France winner.

In order to do so, you look at the participants' 40-kilometer time trial times.

Admittedly, the ability to ride about 25 miles quickly is a necessary attribute for the eventual winner.

However, if you are one-dimensional, and do not consider climbing ability, endurance for a three-week stage race, tactics and strategy, and team support—to name just a few additional factors, your prediction ability will be limited.

## 3D Analogy



**Figure 211. Why is retention time, in single ion mode, insufficient to identify testosterone or testosterone? Consider this analogy. Suppose you are looking for a cube among three objects. In the top row, all objects are possibilities. In the middle row, two objects are possibilities. In the bottom row, finally you can identify the cube. Looking at just one ion is like looking in just one dimension. You cannot be sure what compound you are identifying.**

**Need for Identical Columns**

As discussed in *Bad Identification: Wrong Column Used* on page 188, when GC/C-IRMS analysis is performed on two separate machines, the columns must be identical.

## Appendix H: Testing Terms<sup>419</sup>

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Read more about the test procedures and problems on page 313.

### Chromatography<sup>420</sup>

#### *Adjusted Retention Time ( $t'_R$ )*

The solute total elution time minus the retention time for an unretained peak (holdup time):  $t'_R = t_R - t_M$

#### *Adjusted Retention Volume ( $V'_R$ )*

The solute total elution volume minus the retention volume for an unretained peak (holdup volume):  $V'_R = V_R - V_M$

#### *Baseline*

The portion of a detector record resulting from only eluant or carrier gas emerging from the column.

#### *Column*

A metal, plastic, or glass tube packed or internally coated with the column material through which the sample components and mobile phase (carrier-gas) flow and in which the chromatographic separation takes place.

#### *Capillary Column*

This column has small-diameter tubing (0.25–1.0 mm internal diameter) in which the inner walls are used to support the stationary phase (liquid or solid).

#### *Coelution*

Two or more compounds eluting at the same time.

#### *Column Material*

The material in the column used to effect the separation. An adsorbent is used in adsorption chromatography; in partition chromatography, the material is a stationary phase distributed over an inert support or coated on the inner walls of the column.

#### *Column Oven*

A thermostatted section of the chromatographic system containing the column, the temperature of which can be varied over a wide range.

#### *Carrier Gas*

The phase that transports the sample through the column. Synonymous with mobile or moving phase.

#### *Chromatogram*

A plot of the detector response (which uses effluent concentration or another quantity used to measure the sample component) versus effluent volume or time.

#### *Chromatograph (verb)*

To separate sample components by chromatography.

#### *Chromatograph (noun)*

The specific instrument employed to carry out a chromatographic separation.

#### *Chromatography*

A physical method of separation of sample components in which these components distribute themselves between two phases, one stationary and the other mobile. The stationary phase may be a solid or a liquid supported on a solid.

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<sup>419</sup> Compiled by Denis Demir, MD, from listed references.

<sup>420</sup> Grob, Robert L. Modern Practice of Gas Chromatography, with a few additions. [http://media.wiley.com/product\\_data/excerpt/30/04712298/0471229830-1.pdf](http://media.wiley.com/product_data/excerpt/30/04712298/0471229830-1.pdf). Accessed October 25, 2007.

***Derivatization***

Compounds are often derivatized to make them more volatile or less polar (e.g., by silylation, acetylation, methylation) and consequently suitable for analysis by GC.

***Detector***

A device that signals the presence of a component eluted from a chromatographic column.

***Elute***

To pass through a chromatography column.

***Fronting***

Asymmetry of a peak such that, relative to the baseline, the front of the peak is less sharp than the rear portion.

***Holdup Time***

The time necessary for the carrier gas to travel from the point of injection to the detector. This is characteristic of the instrument, the mobile phase flow rate, and the column in use.

***Internal Standard***

A pure compound added to a sample in known concentration for the purpose of eliminating the need to measure the sample size in quantitative analysis and for correction of instrument variation.

***Marker***

A reference component that is chromatographed with the sample to aid in the measurement of holdup time or volume for the identification of sample components.

***Mobile Phase***

Synonymous with carrier gas or gas phase.

***Peak***

The portion of a differential chromatogram recording the detector response or eluate concentration when a compound emerges from the column. If the separation is incomplete, two or more components may appear as one peak (unresolved peak).

***Peak Area***

The area enclosed between the peak and peak base. Synonymous with band area.

***Peak Base***

The baseline between the base extremities of the peak.

***Peak Height (h)***

The distance between the peak (band) maximum and the peak base, measured parallel to the detector response axis and perpendicular to the time axis.

***Peak Maximum***

The point of maximum detector response when a sample component elutes from the chromatographic column.

***Peak Resolution ( $R_S$ )***

The separation of two peaks in terms of their average peak widths:

$$R_S = 2\Delta t_R / w_a + w_b = 2\Delta t' R / w_a + w_b$$

***Programmed-Temperature Chromatography***

A procedure in which the temperature of the column is changed systematically during a part or the whole of the separation.

***Qualitative Analysis***

A method of chemical identification of sample components. Quantitative analysis involves the estimation or measurement of either the concentration or the absolute weight of one or more components of the sample.



***Relative Retention***

The adjusted retention volume of a substance related to that of a reference compound obtained under identical conditions.

***Retention Time (Absolute) ( $T_R$ )***

The amount of time that elapsed from injection of the sample to the recording of the peak maximum of the component band (peak).

***Sample***

The gas or liquid mixture injected into the chromatographic system for separation and analysis.

***Sample Injector***

A device used for introducing liquid or gas samples into the chromatograph. The sample is introduced directly into the carrier-gas stream (e.g., by syringe) or into a chamber temporarily isolated from the system by valves that can switch the gas stream through the chamber (gas sampling valve).

***Separation***

The time elapsed between elution of two successive components, measured on the chromatogram as the distance between the recorded bands.

***Shoulder***

A hump on the leading or trailing edge of a peak. May be due to coelution. Without an obvious hump, coelution may appear as fronting or tailing.

***Solute***

Components in a sample.

***Solvent***

Synonymous with liquid phase (stationary phase or substrate).

***Split Injection (capillary column)***

A method of injecting samples into a capillary system. The sample is introduced into a flash vaporizer and the splitter reduces the amount of sample going onto the column by the use of restrictors so that the majority of the sample goes into the vent and not onto the capillary column. Typical split ratios are 100–1 and 200–1. The lower number refers to the quantity going onto the column.

***Splitless Injection (capillary column)***

A flash vaporization technique. The solvent is evaporated in the injection port and condenses on the head of the column. After a suitable time (usually 0.5 min), the splitter is opened and any of the remaining material in the flash vaporizer is vented. The solvent that will have condensed at the head of the column is then slowly vaporized through column temperature programming.

Splitless injection is used to concentrate small quantities of solute in a large injection (2–3  $\mu\text{L}$ ) onto a capillary column. The solute should have a higher boiling point than the condensed solvent so that its relative retention time is at least 1.5 and its retention index is greater than 600.

***Stationary Phase***

Synonymous with liquid phase, distributed on a solid, in gas-liquid chromatography or the granular solid adsorbent in gas-solid chromatography. The liquid may be chemically bonded to the solid.

***Tailing***

Asymmetry of a peak such that, relative to the baseline, the front is steeper than the rear.

***Temperature Programming***

In this procedure, the temperature of the column is changed systematically during part or all of the separation process.

## Mass Spectrometry (MS)<sup>421</sup>

### *Diagnostic Ion*

Product ion whose formation reveals structural or compositional information of its precursor. For instance, the phenyl cation in an electron ionization mass spectrum is a diagnostic ion for benzene and derivatives.

### *Ion*

An atomic, molecular, or radical species with an unbalanced electrical charge. The corresponding neutral species need not be stable.

### *Isotope Ratio Mass Spectrometry (IRMS)*

The measurement of the relative quantity of the different isotopes of an element in a material using a mass spectrometer.

### *Mass Spectrometer*

An instrument that measures the  $m/z$  values and relative abundances of ions.

### *Mass Spectrometry*

Branch of science that deals with all aspects of mass spectrometers and mass spectrographs and the results obtained with these instruments.

### *Mass Spectrum*

A plot of the relative abundances of ions forming a beam or other collection as a function of their  $m/z$  values.

### *Mass Analysis*

A process by which a mixture of ionic (or neutral) species is separated according to the mass-to-charge ( $m/z$ ) ratios (for ions) or their aggregate atomic masses (for neutrals). The analysis may be qualitative and/or quantitative.

### *Peak (in mass spectrometry)*

Localized region of relatively large ion signal in a mass spectrum. Although peaks are often associated with particular ions, the terms peak and ion should not be used interchangeably.

### *Peak Intensity*

Height or area of a peak in a mass spectrum.

### *Peak Matching*

Procedure for accurately measuring the mass of an ion using scanning mass spectrometers. The peak corresponding to the unknown ion and that for a reference ion of known  $m/z$  are displayed alternately on a display screen and caused to overlap by adjusting appropriate electric fields.

### *Precursor Ion*

Ion that reacts to form particular product ions. The reaction can be unimolecular dissociation, ion/molecule reaction, isomerization, or change in charge state.

### *Precursor Ion Scan*

Scan function or process that records a precursor ion spectrum.

### *Selected Ion Monitoring (SIM)*

Operation of a mass spectrometer in which the abundances of several ions of specific  $m/z$  values are recorded rather than the entire mass spectrum.

### *Stable Ion*

Ion with internal energy sufficiently low that it does not rearrange or dissociate prior to detection in a mass spectrometer.

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<sup>421</sup> Murray, KK, et al. IUPAC Standard Definitions of Terms Relating to Mass Spectrometry. [http://www.msterms.com/docs/IMSC\\_IUPAC\\_Poster.pdf](http://www.msterms.com/docs/IMSC_IUPAC_Poster.pdf). Accessed October 25, 2007.

## GC/C-IRMS<sup>422</sup>

### *Continuous-Flow (CF)*

An automated preparation device and mass spectrometer in which sample analysis is conducted in a continuous stream of carrier gas.

### *Delta Units (δ)*

$\delta = [(R_s / R_r) - 1] * 1000$  where  $R_s$  is the ratio of the heavy isotope to the light isotope of the sample and  $R_r$  is the ratio of the heavy isotope to the light isotope of the reference.

Delta units are expressed in molecules per thousand, or “per mil”.

For example,  $\delta^{15}\text{N}_{\text{Air}} = 12$  per mil means that the sample was analysed against a reference material and found to be 12 molecules per thousand more than Air - the accepted zero point for expression of nitrogen-15 in per mil notation.

### *Fractionation*

The enrichment or depletion of a stable isotope caused by natural or artificial processes, e.g. photosynthetic pathways can fractionate carbon-13.

### *Inlet*

Part of an IRMS [machine] that allows the sample to enter the ion source. There are two common types, dual inlet and continuous flow.

### *Ion Source*

Part of an IRMS [machine] in which the sample gas is ionised and accelerated into the flight tube.

### *Isotopes*

Atoms whose nuclei contain the same number of protons but a different number of neutrons.

### *Isotope Ratio Mass Spectrometer (IRMS)*

A mass spectrometer that separates charged molecules of differing mass by using a magnetic sector. Isotope ratio refers to a mass spectrometer designed specifically for measuring stable isotope ratios precisely.

### *Isotope Ratio*

The ratio of a minor isotope to a major isotope (e.g. in air, nitrogen contains 0.3663 Atom %  $^{15}\text{N}$  isotopes and 99.6337 Atom %  $^{14}\text{N}$  isotopes, giving an isotope ratio of  $0.3663/99.6337 = 0.003676466$ ).

### *Natural Abundance*

The concentration of a specific stable isotope found in nature (e.g. Nitrogen in air is 0.3663%  $^{15}\text{N}$  and 99.6337%  $^{14}\text{N}$ ).

### *Pee Dee Belemnite (PDB)*

A belemnite from the cretaceous Pee Dee formation, South Carolina, USA. Used as the accepted zero point standard for expression of carbon and oxygen isotope abundances (e.g. -10 per mil  $^{13}\text{C}$  vs. PDB).

### *Stable Isotope*

A non-radioactive isotope in which the number of protons and neutrons in the atomic nucleus is constant over time.

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<sup>422</sup> Isotope Glossary. <http://www.iso-analytical.com/terminology2.html>. [minor editing]. Accessed October 25, 2007.

## Analytical Terms<sup>423</sup>

### *Analyte*

The compound of interest that is being measured. It is often called the target analyte. A sample may contain multiple analytes.

### *Blank Sample*

A sample composed of a clean, representative solvent that has been extracted using the same procedure as for actual samples. A blank sample is used to determine if any peaks in the sample chromatogram are contributed by the materials (solvents, reagents, glassware, etc.) used in the sample extraction or preparation procedure.

### *Control Sample*

A sample of the same type as the sample of interest, but without any analytes. It is subjected to the same extraction or preparation procedure as used for actual samples. A control sample is used to determine whether the sample matrix chromatogram contains any peaks that may interfere or co-elute with the analyte peaks. Sample matrix material may alter the effectiveness of the extraction or clean up procedure by their presence. Control samples are very useful when developing sample extraction or cleanup methods.

### *Matrix*

A more specific term describing any part of the sample extracted or derived from the original sample substance or material. Food products, soil, groundwater or biological tissues and fluids (e.g. blood, urine, and plant) are examples of matrices. This term is more specific than sample and refers to any material present in the final sample after extraction, preparation or clean up. The analytes are not considered to be part of the matrix.

### *Spike*

A control sample to which a known amount of analyte has been added. The spike sample is subjected to the same extraction or cleanup procedure as an actual sample, and then the amount of the analyte in the spiked sample is determined. The amount of analyte loss is used to correct the sample concentration, thus it compensates for any analyte loss during sample

extraction or preparation. Spiked samples are very useful when developing sample extraction or cleanup methods. Spiked samples are also useful determining the affect of the matrix on GC behavior (e.g. response). If suitable control sample is not available, adding analytes to a blank sample is an alternative, but a less desirable, option.

### *Standard*

A solution containing one or more analytes at a known concentration. It is usually made up in a clean solvent, ideally the same as the sample solvent. Standards are either prepared in the laboratory or purchased from a commercial supplier. They are sometimes called analytical or working standards.

### *Traceability*

Property of a result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons, all having stated uncertainties.

Traceability can be understood in terms of a series of quantified links between the results of a measurement and national or international measurement standards.

Traceability is not in itself an end. The purpose of establishing traceability is to ensure that measurements at the end of a traceability chain can be made in SI units having quantified uncertainties. In this way, they are accurate and therefore comparable with measurements using other methods carried out in different laboratories.

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423 Rood, D. The Troubleshooting and Maintenance Guide for Gas Chromatographers. Wiley. p. 281, Wiley. (2007.)

## Appendix I: Discovery Docs

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### Bates Numbering<sup>424</sup>

Bates numbering (or Bates Stamping) is used in the legal and business fields to sequentially number or date/time-mark images or documents as they are scanned or processed (for example, marking exhibits during the discovery stage of preparations for trial or identifying business receipts). This process provides identification, protection, and auto-increment numbering of the images.

### 995474-Related Bates Numbered Documents

Landis received documents in four main waves: The original document package, and three other productions.

- Documents from the United States Anti-Doping Agency are USADA Bates-numbered.
- Documents from the World Anti-Doping Agency are WADA Bates-numbered.
- Documents from the Laboratoire National de Dépistage du Dopage (the French National lab) are LNDD Bates-numbered.
- Documents from the Agence Française de Lutte contre le Dopage (the French anti-doping agency) are AFLD Bates-numbered.

### Original Production: The Document (Doc) Package USADA0001 to USADA0370.

The laboratory document package of Landis's sample number 995474 'A' and 'B' results.<sup>425</sup>

The 370-page document package (doc pac) outlining the details of the claim of the lab, the Laboratoire National de Dépistage du Dopage (LNDD) and the United States Anti-Doping Agency (USADA) against Landis.

These documents were received by Landis's attorney Howard Jacobs on or about August 31, 2006.

For a detailed table of contents of the doc pac, see page 341.

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<sup>424</sup> *Bates numbering*. From Wikipedia, the free encyclopedia.  
[http://en.wikipedia.org/wiki/Bates\\_numbering](http://en.wikipedia.org/wiki/Bates_numbering). Accessed 4/2/2007.

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<sup>425</sup> The entire 370-page analytical dossier, "The Document Package," can be downloaded from:  
<http://arniebakercycling.com/books/wiki.htm>.

## USADA First Production of Documents

USADA0371 to USADA1081

WADA0001 to WADA0143

LNDD0001 to LNDD0352

USADA Response to Respondent's Second Request for Production of Documents, as ordered by the AAA Panel's Procedural Order No. 1 entered February 2, 2007.

The cover letter for these documents is dated February 7, 2007.

The documents were received by Landis's attorney Maurice Suh on or about February 9, 2007.

### *Volume 1: Longitudinal Data, Mostly*

USADA0371-0475 Test results of 2006 TDF samples.

USADA0371-0405 B testing of Stage 17 sample.

USADA0406-0470 LNDD TDF steroid profile data.  
Same or similar to AFLD.

USADA0471 LNDD to USADA cover letter enclosing full doc package for Stage 17 'B' sample.

USADA0472 USADA e-mail: that doc pac contains no page 105.

USADA0476-0731 Summaries of results only; no actual lab documentation provided.

USADA0487 UCLA longitudinal profile data.  
7 samples between 12/02 and 4/06.  
Reports sample number, pH, specific gravity, collection date, T/E ratio, testosterone concentration, epitestosterone concentration, androsterone concentration, etiocholanolone concentration, and "DIOL5AX" and "DIOL5BX."

USADA0489 UCI to Tygart 8/8/06 e-mail advising a fax sent by Varin was in error and asking that it be destroyed; USADA0490 is an 8/8/06 e-mail reply from USADA confirming that the fax was shredded.

USADA0491-0533 UCI steroid profile data.  
42 samples between 08/99 end of 2006 TDF.

Reports date of collection, event, lab performing the test, sample number, and the T/E ratio. No absolute concentration levels (such as for T or E).

Corresponding doping control forms and summary reports with the same minimal information.

USADA0535-0536 UCLA steroid profile data fax.

11 samples collected between 4/05 and 4/06.

Reports date of collection and sample number, no data at all.

Appears to be different samples than those referred to in USADA0487.

Additional data on these samples provided at USADA 0564: provides sample number, collection date, specific gravity, T/E ratio, testosterone concentration, epitestosterone concentration, androsterone concentration, etiocholanolone concentration, 5 $\alpha$ -Adiol concentration, and 5 $\beta$ -Adiol concentration.

USADA0552-0556 Madrid steroid profile data.

7 samples between 4/00 and 9/94

Note example letter from USADA at 0554 providing language for response (such as "the screen results for these samples are accurate"). USADA 0555 provided information for 7 samples between 4/00 and 9/94: provides only sample number, date of collection and T/E ratio, no other data or documentation. USADA 0584 provides the following information for the same samples: pH, specific gravity, T/E/ ratio, testosterone concentration, epitestosterone concentration, androsterone concentration, etiocholanolone concentration, 5 $\alpha$ -Adiol concentration, 5 $\beta$ -Adiol concentration, and DHEA concentration.

USADA0557-0561 LNDD steroid profile data.

15 samples.

	USADA 0559 only sample number and T/E ratio (does not even provide date of collection), no other data or documentation. USADA 0575 provides same data and includes collection date (from 9/99 – 3/06). USADA 0582 provides the following additional data for some of the same samples, with various information reportedly unavailable for certain samples: pH, specific gravity, T/E ratio, testosterone concentration, epitestosterone concentration, androsterone concentration, etiocholanolone concentration, 5 $\alpha$ -Adiol concentration, 5 $\beta$ -Adiol concentration, and DHEA concentration.		0723 and 0728 provide summary IRMS data for these samples.
USADA0587-0589	Lisbon steroid profile data. One sample collected 2/04. USADA 0589 provides sample number, collection date, pH, specific gravity, T/E ratio, testosterone concentration, epitestosterone concentration, androsterone concentration, etiocholanolone concentration, 5 $\alpha$ -Adiol concentration, and 5 $\beta$ -Adiol concentration.	USADA0605-0721 USADA0722-0731	Further info about longitudinal data. IRMS reports, basic, of post-Tour UCLA testing.
USADA0604	UCLA steroid profile data. Two samples collected 08/06. USADA 0606 provides sample number, pH, specific gravity, T/E ratio, testosterone concentration, epitestosterone concentration, androsterone concentration, etiocholanolone concentration, 11b-OHA concentration, and 11b-OHE concentration. In addition, notes that screen data for androsterone concentration, etiocholanolone concentration, 11b-OHA concentration, and 11b-OHE concentration are not reliable. USADA 0607 provides the following additional data for these samples: 5 $\alpha$ -Adiol concentration, and 5 $\beta$ -Adiol concentration. USADA		
		<b><i>Volume 2: Mostly studies, some e-mails</i></b>	
		USADA0732-0733	IOC IRMS Criteria, 2001. Need for reference range.
		USADA0734-0740	Manfred Donike Workshop Slide Show 2002.
		USADA0741	Ueki e-mail about inter-lab deviations.
		USADA0742-0747	de la Torre 2001.
		USADA0746-0752	Becchi 1994.
		USADA0753-0761	Shackleton 1997.
		USADA0762-0768	Ueki 1999.
		USADA0769-00779	Aguilera 1999.
		USADA0780-0785	Aguilera 2000.
		USADA0786-0789	Saudan 2005.
		USADA0790-0797	Saudan 2004.
		USADA0798-0803	Maitre 2004.
		USADA0804-0810	Baume 2006.
		USADA0811-0819	Aguilera 2001.
		USADA0820-0828	Shackleton 1997.
		USADA0829-0835	Cawley 2005.
		USADA0836-0846	TD2004EAAS.
		USADA0847-0865	USADA GC IRMS Symposium, Intro.
		USADA0866-0879	USADA GC IRMS Symposium, Session 1.
		USADA0880-0890	USADA GC IRMS Symposium, Session 2.
		USADA0891-0904	USADA GC IRMS Symposium, Session 3.
		USADA0905-0916	Donike: Steroid Profiling in Cologne.
		USADA0917-0926	Donike: Reference Ranges.
		USADA0927-00928	Stability of Steroid Profiles.
		USADA0929-0938	Donike: Evaluation of Longitudinal Studies.
		USADA0939-0945	Engelke: Stability of Steroid Profiles.
		USADA0946-0950	Donike: Statistical Evaluation of Longitudinal Studies.

USADA0951-0960	Geyer: Factors Influencing the Steroid Profile.
USADA0961-0970	Geyer: The Cologne protocol to follow up high T/E ratios.
USADA0971-1002	Correspondence about testing B samples from LNDD and UCLA.
USADA1004-1007	Correspondence about Baker slide show.
USADA1008-1048	USADA Grant IRMS.
USADA1049-1077	E-mails.
USADA1049-1057	E-mail Reference gas cautions.
USADA1058-1062	E-mail Ayotte. Errors in TD2004EAAS.
USADA1063-1064	E-mail about need to harmonize lab performance.
USADA1067-1077	E-mails about IRMS Working group and meeting agenda.
USADA1078-1082	Landis signed releases.

### ***Volume 3: WADA Documents***

WADA0001-0010	Non missed test info.
WADA0011-0021	TD2004EAAS.
WADA0022-0078	ISL 3.0.
WADA0079-0138	ISL 4.0 and addendum.
WADA0139-	Landaluce message: obligation of labs.
WADA0140-0142	TD2003LDOC.
WADA0143	2005 AAFs.

### ***Volume 4: LNDD Documents***

LNDD0001	7 other TDF 2006 samples.
LNDD0036	7 TDF 2006 calibration data.
LNDD0073	LNDD accreditation.
LNDD0106	LNDD forms evolution.
LNDD0115	Blank urines for 7 other TDF 2006 samples.
LNDD0137	July 2006 sample numbers.
LNDD0147	LNDD personnel.
LNDD0155	Critique of Baker slide show.
LNDD0161	SOP forms.
LNDD0162-0166	SOP M-MM-01.
LNDD0167-0175	SOP E-MM.
LNDD0176-0181	SOP P-ME-01.
LNDD0182-0187	SOP P-TE-03.
LNDD0188	CPLD/AFLD correspondence.
LNDD0205	IRMS: numbers of samples and positive rate.
LNDD0208	Mathurin, 2001.
LNDD0216	Ferry.
LNDD0219	TD2004EAAS.
LNDD0239	Machine purchase and certificates.
LNDD0308	IRMS negative control urines.
LNDD0312	Linearity results for IsoPrime.
LNDD0333	GC/MS scans of 6 IRMS peaks.
LNDD0346	USADA0105 clear copy.
LNDD0350	Derivatization marker.



## USADA Second Production of Documents

USADA1082-1137

LNDD0353 -0483

AFLD0001-0013

USADA Response as ordered by the AAA Panel.

The cover letter for these documents is dated March 30, 2007.

The documents were received by Landis's attorney Maurice Suh on or about April 1, 2007.

USADA1082-1132	Results of other Landis sample testing.
USADA1133-1134	Catlin letter of variation in metabolites.
USADA1135-1137	Tygart letter to AFLD.
LNDD0353-0377	Results of other Landis sample testing.
LNDD0378-0380	995475 and 995476 sample reports.
LNDD0381-0431	ISO (COFRAC) report.
LNDD0432-0435	IRMS data for negative samples 2006.
LNDD0436	IRMS data for positive samples 2004-2006.
LNDD0437-0440	Reference solution missing testosterone, epiT, CH <sub>3</sub> T
LNDD0441-0442	SOP M-EXMIX-05 for mix preparation of acetate and cal acetate.
LNDD0443	SOP E-P-33 for mix 003.
LNDD0444-0447	Composition acetate and cal acetate.
LNDD0448-0450	IRMS standard mix measurement history.
LNDD0451-0460	Validation of delta value uncertainty.
LNDD0461-0471	Validation of T, E, T/E uncertainty.
LNDD0472-0476	Reference population of athletes screened suspicious and subsequently declared negative.
LNDD0477	Cover letter for docs beginning LNDD0089.
LNDD0478-0483	Milcova, 1991. Study previously omitted.
AFLD0001-0013	Stage 17 anti-doping control forms 5 other riders and Stage 16 anti-doping control forms from 7 other riders.

## SOP Production

LNDD0520-0632

USADA Response as ordered by the AAA Panel.

The Standard Operating Procedure (SOP) documents were received by Landis's attorney Maurice Suh on or about April 25, 2007.

The contents of these documents are summarized in the appendix found on page 339.

LNDD0520-0525	SOP P-TE-01 Traitement des Echantillons.
LNDD0526-0536	SOP T-TE-03 Mise en Tube.
LNDD0537-0540	SOP I-VOL-01 Détermination des Volumes.
LNDD0541-0554	SOP I-N-29 Utilisation Couplage IRMS.
LNDD0555-0572	SOP I-M-17 Maintenance Couplages IRMS.
LNDD0573-0584	SOP I-N-13H Utilisation Couplage HP.
LNDD0585-0597	SOP I-M-03C Maintenance Couplage HP.
LNDD0598-0602	SOP M-DPMSD-02 Confirmation Quant.
LNDD0603-0609	SOP M-DP-31 Confirmation IRMS.
LNDD0610-0611	SOP M-Dp-24D Confirmation Semi-Quant.
LNDD0612-0620	SOP E-SEUIL-01 Seuils Applicable.
LNDD0621-0629	SOP P-GD-01 Gestion Documentation.
LNDD0630-0632	SOP M-CE-02 Dossier de CE et Diffusion.

**Later Exhibits**

After the productions discussed above, additional exhibits were made by both Landis and USADA.

Most of these exhibits consisted of correspondence, papers written by experts, records of the retesting and reprocessing.

For the CAS appeal, some items produced at the AAA hearing became CAS exhibits. USADA/LNDD also produced additional documents to refute allegations and findings made at the AAA hearing.

# Appendix J: Doc Pac Table of Contents

## USADA0002

WADA Technical Document TD2003LDOC specifies that the document package must contain a table of contents.

The compilation of information presented by LNDD and USADA

<b>'A' Sample</b>		<b>2<sup>nd</sup> Confirmation T/E</b>	<b>70</b>		
<b>Administrative Part</b> (page missing)	<b>3</b>	SOP L-CONF-01: List of confirmation SOPs	71-73	Sample F1 results	134
Summary of results	4-9	SOP M-EX-04B: Confirmation T/E	74-76	Sample F1 chromatograms	135
Chain of custody	10-12	SOP I-EX-11: Extraction Anabolic	77-78	Blu 1 F2 results	136
Worker weekly/daily sign in sheets	13-20	Aliquot processing record	79	Blu 1 F2 chromatograms	137
Landis anti-doping control form	21	Instrument control parameters 6890 GC	80-83	Reinjected Sample F2 results	138
Doping control officer (Bordaberry) form	22	Vial sequencing	84	Reinjected Sample F2 chromatograms	139
LNDD reception records	23-24	Quantification T/E	85-87	Sample F2 results (rejected)	140
Lab failure for Stanazolol measurement	25	Linearity graph testosterone	88	Sample F2 chromatograms	141
		Linearity graph epitestosterone	89	Blu 1 F3 results	142
<b>Technical Part</b>	<b>26</b>	Blu chromatograms (negative control)	90-91	Blu 1 F3 chromatograms	143
<b>Immunologic Screening</b>	<b>27</b>	Sample results	92	Sample F3 results	144
SOP M-AN-08: Immunologic screening	28-32	Sample chromatograms	93	Sample F3 chromatograms	145
Aliquot processing record	33	Blu chromatograms (negative control)	94-96	Instrument performance checklist	146-151
Results BhCG and LH	34	Instrument performance checklist MSD 20	97-99		
		Blu spiked chromatograms T = E = 2	100	<b>IRMS Part</b>	<b>152</b>
<b>Natural Hormone Screening</b>	<b>35</b>	Results form	101	SOP M-AN-41: (page missing)	153-154
SOP L-SCREENING: Assays list	36			Batch data processing results	155
SOP M-EX-04: Anabolic screening	37-39	<b>GC/C-IRMS</b>	<b>102</b>	Blu 1 F1 GC/MS chromatogram	156
SOP M-EXMIX-04: Mix-anabolic screening	40-42	SOP L-CONF-01: Confirmation SOPs List	103-105	Blu 1 F1 results	157
Aliquot processing record	43	SOP M-EX-24: Conf GC/C-IRMS	106-109	Blu 1 F1 IRMS chromatogram	158
Mix processing record (previous day)	44	SOP I-EX-06: 1 <sup>st</sup> extraction	110-112	Sample F1 GC/MS chromatogram	159
Instrument control parameters 6890 GC	45-50	SOP I-EX-07: 2 <sup>nd</sup> extraction	113-115	Sample F1 results	160
		SOP I-EX-08: 3 <sup>rd</sup> extraction	116-118	Sample F1 IRMS chromatogram	161
1 <sup>st</sup> Screening blu (negative control) results	51	Aliquot processing record	119-122	Blu 1 F2 GC/MS chromatogram	162
Blu chromatograms	52-53			Blu 1 F2 results	163
1 <sup>st</sup> Screening sample results (rejected)	54	<b>GC/MS Part</b>	<b>123</b>	Blu 1 F2 IRMS chromatogram	164
Sample chromatograms	55-56	Instrument control parameters 6890 GC	124-128	Sample F2 GC/MS chromatogram	165
2 <sup>nd</sup> Screening sample results	57	Vial sequencing	129	Sample F2 results	166
Sample chromatograms	58-59	Mix Ac 50 results	130	Sample F2 IRMS chromatogram	167
1 <sup>st</sup> Screening calibration run	60	Mix Ac 50 chromatograms	131	Blu 1 F3 GC/MS chromatogram	168
Calibration chromatogram	61-62	Blu 1 F1 results	132	Blu 1 F3 results	169
Instrument performance checklist MSD 18	63-69	Blu 1 F1 chromatograms	133	Blu 1 F3 IRMS chromatogram	170

is out of order, inaccurate, confusing, and inadequate.

The page numbers do not reflect USADA Bates stamping. Many of the original page numbers are not visible.

Although I cannot do anything about the order of the pages, here is a more helpful document package table of contents, based on USADA Bates numbering:

Sample F3 GC/MS chromatogram	171
Sample F3 results	172
Sample F3 IRMS chromatogram	173
Instrument performance checklist	174-184
IRMS result form	185-186
<b>Certificate of Analysis</b>	<b>187</b>
AAF report 'A' sample	188-189
<b>Annexes</b>	<b>190</b>
Internal Standard problem report	191
SOP L-CONF-01: Confirmation SOPs List	192-194
SOP M-EX-04B: Confirmation T/E	195-197
SOP I-EX-11: Extraction Anabolic	198-199
<b>1<sup>st</sup> Confirmation T/E (rejected)</b>	
1 <sup>st</sup> confirmation aliquot processing record	200
Instrument control parameters	201-204
Vial sequencing	205
Quantification T/E	206-207
Linearity graph testosterone	208
Linearity graph epitestosterone	209
Blu T/E chromatograms	210-211
Sample results	212
Sample chromatographs	213
Unhydrolyzed sample results	214
Unhydrolyzed sample chromatograms	215
Linearity chromatograms (spiked Blu runs)	216-218
Instrument performance checklist	219-222
Result form	223
<b>'B' Sample</b>	
Cover page	224
Table of contents	225
<b>Administrative Part</b>	<b>226</b>
Doping control officer (Bordaberry) form	227
Landis anti-doping control form	228
LNDD reception records	229-230
Correspondence	231-249

Staff planning	249
Receipt of A sample doc package	250
B sample opening form	251-252
Chain of custody	253-257
<b>Technical Part</b>	<b>258</b>
<b>Confirmation T/E</b>	<b>259</b>
Summary of T/E results	260
SOP M-EX-04B: Confirmation T/E	261-263
Aliquot processing report	264
Instrument control parameters	265-268
Quantification T/E	269-271
Vial sequencing	272
Linearity graph testosterone	273
Linearity graph epitestosterone	274
Blu chromatograms (negative control)	275-276
1 <sup>st</sup> sample run chromatograms	277
1 <sup>st</sup> run results	278
2 <sup>nd</sup> sample run results	279
2 <sup>nd</sup> run confirmation chromatograms	280
3 <sup>rd</sup> sample run results	281
3 <sup>rd</sup> run chromatograms	282
Unhydrolyzed sample results	283
Unhydrolyzed chromatograms	284
Linearity chromatograms (spiked Blu runs)	285-287
Result form	288
Instrument performance checklist	289-292
<b>GC/C-IRMS</b>	<b>293</b>
SOP E-RECAP-01: Analysis presented	294
SOP M-EX-24: Conf GC/C-IRMS	295-298
<b>GC/MS Part</b>	<b>299</b>
Aliquot processing report	299-302
Instrument control parameters GC 6890	303-307
Vial sequencing	308
Mix Ac 50 results	309
Mix Ac 50 chromatograms	310
Blu 1 F1 results	311
Blu 1 F1 chromatograms	312
Sample F1 results	313
Sample F1 chromatograms	314
Blu 1 F2 results	315

Blu 1 F2 chromatograms	316
Sample F2 results	317
Sample F2 chromatograms	318
Blu 1 F3 results	319
Blu 1 F3 chromatograms	320
Sample F3 results	321
Sample F3 chromatograms	322
<b>IRMS Part</b>	<b>323</b>
Instrument performance checklist	323-328
SOP M-AN-41: Conf GC/C-IRMS	329-330
Batch data processing results	331
Blu 1 F1 GC/MS chromatogram	332
Blu 1 F1 IRMS chromatogram	333
Missing page	334
Blu F1 results	335
Sample F1 GC/MS chromatogram	336
Sample F1 IRMS chromatogram	337
Sample F1 results	338
Blu 1 F2 GC/MS chromatogram	339
Blu 1 F2 IRMS chromatogram	340
Blu 1 F2 IRMS results	341
Sample F2 GC/MS chromatogram	342
Sample F2 IRMS chromatogram	343
Sample F2 results	344
Blu 1 F3 GC/MS chromatogram	345
Blu 1 F3 IRMS chromatogram	346
Blu 1 F3 results	347
Sample F3 GC/MS chromatogram	348
Sample F3 IRMS chromatogram	349
Sample F3 results	350
IRMS result form	351-352
Instrument performance checklist	353-363
<b>Certificate of Analysis</b>	<b>364</b>
AAF report 'B' sample	365-366
<b>Annexes</b>	<b>367</b>
Statements of Dr. de Boer	368-369
List of requests of Dr. de Boer	370

## Appendix K: References

### Studies: Top-Level References

Peer-reviewed general scientific-community published works are the highest level of reference—although even within this category studies may be of marginal quality.

### Studies: RADA References

Many of the following papers were published in annual reviews of *Recent Advances in Doping Analysis, Proceedings of the Cologne Workshops on Dope Analysis*. These are not generally peer-reviewed scientific articles.

Although many of the authors are respected and have published peer-reviewed articles, RADA articles are almost invariably authored by WADA-accredited lab researchers with a bias toward discovering doping offenses.

(Said differently, in test design terminology, the bias is toward sensitivity rather than specificity.)

RADA meetings and dates, publication dates of studies used in this document from 1993 through 2004 are available online at:

<http://proceedings.pulse180.de>.

### Cologne Workshop/RADA/Date/X-Reference

Cologne Workshop	RADA Meet	Year
1		1983
2		1984
3		1985
4		1986
5		1987
6		1988
7		1989
8		1990
9		1991
10		1992
11	1	1993
12	2	1994
13	3	1995
14	4	1996
15	5	1997
16	6	1998
17	7	1999
18	8	2000
19	9	2001
20	10	2002
21	11	2003
22	12	2004
23	13	2005
24	14	2006

**Table 53.** Cologne workshops, RADA meetings and dates, publication dates of studies used in this document. Documents from 1993 through 2004 are available online at: <http://proceedings.pulse180.de/>.

## WADA Rules, Standards, and Technical Documents

These are the applicable governing rules referenced through this book:

1. [WADA World Anti-Doping Code. \(2003\).](#)<sup>426</sup>
2. [WADA International Standard for Laboratories. \(2004\).](#)
3. [International Organization for Standardization. ISO 17025. \(2005\).](#)<sup>427</sup>
4. [WADA Technical Document—TD2003IDCR. 1. \(2003\).](#)<sup>428</sup>  
Identification criteria for qualitative assays incorporating chromatography and mass spectrometry.
5. [WADA Technical Document – TD2003LCOC. \(2003\).](#)  
Laboratory internal chain of custody
6. [WADA Technical Document – TD2003LDOC. \(2003\).](#)<sup>429</sup>  
Laboratory documentation packages
7. [WADA Technical Document – TD2004EAAS. \(2004\).](#)<sup>430</sup>  
Reporting and evaluation guidance for testosterone, epitestosterone, T/E ratio and other endogenous steroids.
8. [SOP I-N-29. Notice d’Utilisation du Couplage GC/C/IRMS – IsoPrime1.](#)<sup>431</sup> LNDD0541 to LNDD0554.

<sup>426</sup> [http://www.wada-ama.org/rtecontent/document/code\\_v3.pdf](http://www.wada-ama.org/rtecontent/document/code_v3.pdf).

<sup>427</sup> <http://www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=39883>.

<sup>428</sup> [http://www.wada-ama.org/rtecontent/document/criteria\\_1\\_2.pdf](http://www.wada-ama.org/rtecontent/document/criteria_1_2.pdf).

<sup>429</sup> [http://www.wada-ama.org/rtecontent/document/lab\\_docs\\_1\\_3.pdf](http://www.wada-ama.org/rtecontent/document/lab_docs_1_3.pdf).

<sup>430</sup> [http://www.wada-ama.org/rtecontent/document/end\\_steroids\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/end_steroids_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22).

<sup>431</sup> Linked at: <http://arniebakercycling.com/books/wiki.htm>.

## WADA Reference Documents

The next 62 references (numbers 9 through 70) are those found in WADA Technical Document TD2004EAAS references.<sup>432</sup>

Key references to IRMS of testosterone more recent than 1997 that I have reviewed are highlighted in yellow.

Seminal references are highlighted in bold yellow.

T/E references I have reviewed are highlighted in green.

Non-WADA references follow this list.

9. Aguilera, R., Becchi, M., et al. Improved method of detection of testosterone abuse by gas chromatography /combustion/ isotope ratio mass spectrometry analysis of urinary steroids. J. Mass Spectrom. 31, 169. (1996). Have reviewed full text.
10. Aguilera, R., Catlin, D.H., Becchi, et al. Screening for exogenous testosterone by isotope ratio mass spectrometric analysis of one pregnanediol and two androstanediols. J. Chromatogr. B. 727-795. (1999). Have reviewed abstract.
11. Aguilera, R., Chapman, T.E., and Catlin, D.H. A rapid screening assay for measuring urinary androsterone and etiocholanolone 13C (0/00) values by gas chromatography/combustion/isotope ratio mass spectrometry. Rapid Commun. Mass Spectrom. 14: 2294. (2000). Have reviewed abstract.
12. Aguilera, R., Chapman, T.E., Starcevic, B., et al. Performance characteristics of a carbon isotope ratio method for detecting doping with testosterone based on urine diols: controls and athletes with elevated testosterone/epitestosterone ratios. Clin. Chem. 47: 292. (2001). Have reviewed full text.
13. Aguilera, R., Hatton, C.K., and Catlin, D.H. Detection of epitestosterone doping by isotope ratio mass spectrometry. Clin Chem. 48(4):629-36. (2002). Have reviewed full text.

<sup>432</sup> WADA TD2004EAAS. 5-11. (2004). Reporting and evaluation guidance for testosterone, epitestosterone, T/E ratio and other endogenous steroids. [http://www.wada-ama.org/rtecontent/document/end\\_steroids\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22](http://www.wada-ama.org/rtecontent/document/end_steroids_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20technical%20document%22). Accessed Dec 28, 2006.

14. Ayotte, C., Charlebois, A., LaPointe, et al. Validity of urine samples: microbial degradation. Recent advances in doping analysis. Proceedings of the 14th Köln Workshop on Dope Analysis, Institut für Biochemie, Köln, Germany, March 17-22, 1996, W. Schänzer, H. Geyer, A. Gotzmann, U. Mareck-Engelke (editors) Sport und Buch Straub, Köln, pp. 127-137. (1997). [Have reviewed full text.](#)
15. Ayotte, C., Goudreault, D., Lajeunesse, A., et al. GC/C-IRMS and GC/MS in "Natural" Steroids Testing. RADA (9). Sport und Buch Strauß. Köln. pp.133-143. (2001). [Have reviewed full text.](#)
16. Ayotte, C. Evaluation of elevated testosterone/epitestosterone values in athletes' urine samples. IAF New Studies in Athletics, 12:2-3, p. 87. (1997).
17. Ayotte C. The integrity of urine samples: the effects of temperature and bacteria on the validity of the analytical result. Proceedings of the IAF Seminar 1995, Paris, France, October 10-11, 1995, in "Harmonisation of Doping Issues in the IAAF." pp. 127-138. (1997).
18. Baenziger, J. and Bowers, L. Variability of T/E ratios in athletes. Proceedings of the 11th Cologne Workshop on Dope Analysis, 7th to 12th March 1993, M. Donike, H. Geyer, A. Gotzmann, U. Mareck-Engelke, S. Rauth eds. Sport und Buch Strauß. Köln. pp.41-51. (1993). [Have reviewed full text.](#)
19. Bassindale, T., Cowan, D.A, Dale, S., et al. Disposition of androstenedione and testosterone following oral administration of androstenedione to healthy female volunteers: influence on the urinary T/E ratio. RADA (10). Sport und Buch Straub, Köln. pp. 51-60. (2002). [Have reviewed full text.](#)
20. Becchi, M., R. Aguilera, Y. Farizon, et al. Gas chromatography/combustion/isotope-ratio mass spectrometry analysis of urinary steroids to detect misuse of testosterone in sport. Rapid Commun. Mass Spectrom. 8 304. (1994). USADA0748-0752. [Have reviewed full text.](#)
21. Bosy, T.Z., Moore, K.A., and Poklis, A. The effect of oral dehydroepiandrosterone (DHEA) on the urine testosterone/epitestosterone (T/E) ratio in human male volunteers. J. Anal. Toxicol. 22 (6): 455. (1998).
22. Bowers, L.D. Oral dehydroepiandrosterone supplementation can increase the testosterone /epitestosterone ratio. Clin. Chem. 45 (2): 295. (1999).
23. Carlstrom, K., Palonek, E., Garle, M., et al. Detection of testosterone administration by increased ratio between serum concentrations of testosterone and 17 alpha-hydroxyprogesterone. Clin. Chem. 38 1779. (1992).
24. Catlin, D. H., Hatton, C. K., and Starcevic, S. H. Issues in detecting abuse of xenobiotic anabolic steroids and testosterone by analysis of athlete's urine. Doping in Sport Symposium. Clin. Chem. 43(7). pp. 1280 (1997). [Have reviewed full text.](#)
25. Catlin, D. H., Hatton, C. K., Straus, P. W., et al. In D. A. Cowan and A. T. Kicman (eds.). Control of doping with anabolic agents. Proceedings of the Scientific Meeting of the 4th Permanent World Conference on Anti-Doping in Sport, London. p. 2. (1993).
26. Catlin, D.H., Leder, B.Z., Ahrens. B.D., et al. Effects of androstenedione administration on epitestosterone metabolism in men. Steroids. pp. 559-64. (2002). [Have reviewed full text.](#)
27. Cowan, D. A., Kicman, A. T., Walker, C. J., et al. Effect of administration of human chorionic gonadotrophin on criteria used to assess testosterone administration in athletes. J. Endocrinol., 131. p. 147 (1991).
28. Dehennin, L. and Masumoto, A. M. Long-term administration of testosterone enanthate to normal men: alterations of the urinary profile of androgen metabolites potentially useful for detection of testosterone misuse in sport, J. Steroid Biochem. Mol. Biol., 44. p. 179. (1993).
29. Donike, M., Geyer, H., Kraft, M., et al. Long-term Influence of anabolic steroid misuse on the steroid profile. In P. Belotti, G. Benzi, and A. Ljungqvist eds., Doping in Sport, Monte Carlo 1989, International Athletic Foundation, Monte Carlo 107. (1990).
30. Donike, M., Barwald, K. R., Klostermann, K., et al. Nachweis von exogenem Testosteron in Sport: Leistung und Gesundheit, H. Heck, W. Hollmann, H. Liesen, R. Rost eds. Deutscher Ärzte Verlag Köln, 293. (1983).
31. Donike, M., Rauth, S., and Wolansky, A. Reference ranges of urinary endogenous steroids determined by GC/MS. Proceedings of the 10th Cologne Workshop on Dope Analysis, 7<sup>th</sup> to 12<sup>th</sup> June 1992, M. Donike, H. Geyer, A. Gotzmann, U. Mareck-Engelke, S. Rauth eds., Sport und Buch Strauß. Köln. p. 69-86. (1992). USADA0917-USADA0926. [Have reviewed full text.](#)

32. **Donike**, M., Rauth, S., Mareck-Engelke, U., et al. Evaluation of longitudinal studies, the determination of subject based reference ranges of the T/E ratio. Proceedings of the 11th Cologne Workshop on Dope Analysis, 7th to 12th March 1993, M. Donike, H. Geyer, A. Gotzmann, U. Mareck-Engelke, S. Rauth eds. Sport und Buch Strauß. Köln. p.33. (1994). USADA0929-USADA0938. [Have reviewed full text.](#)
33. Donike, M. Steroid profile in Cologne. Proceedings of the 10th Cologne Workshop on Dope Analysis, 7th to 12th June 1992, M. Donike, H. Geyer, A. Gotzmann, U. Mareck-Engelke, S. Rauth eds., Sport und Buch Strauß. Köln. p.47. (1992).
34. **Donike**, M., Mareck-Engelke, U., and Rauth, S. Statistical evaluation of longitudinal studies, part 2: the usefulness of subject based reference ranges. Proceedings of the 12th Cologne Workshop on Dope Analysis, Köln p. 157. (1995). USADA0946-0950. [Have reviewed full text.](#)
35. Falk, O., Palonek, E., and Bjorkhem, I. Effect of ethanol on the ratio between testosterone and epitestosterone in urine. Clin. Chem., 34(7) 1462. (1988).
36. **Flenker**, U. and Schänzer, W. Kinetic isotope effects during metabolism of delta-4-steroids. RADA (9). Sport und Buch Straub, Köln. p. 179. (2001). [Have reviewed full text.](#)
37. **Leder**, B.Z., Catlin, D.H., Longcope, C., et al. Metabolism of orally administered androstenedione in young men. J Clin Endocrinol Metab. 86(8):3654-3658. (2001). [Have reviewed full text.](#)
38. Garle, M., Ocka, R., Palonek, E., et al. Increased urinary testosterone/epitestosterone ratios found in Swedish athletes in connection with a national control program. Evaluation of 28 cases. J. Chromatogr. B, 687, p. 55. (1996).
39. **Garle**, M. and Palonek, E. Androstenedione: excretion studies from single and multiple dose experiments. RADA (6). Sport und Buch Strauß. Köln. p. 181. (1998). [Have reviewed full text.](#)
40. **Geyer**, H., U. Mareck-Engelke, W. Schänzer, et al. The Cologne protocol to follow up high testosterone/epitestosterone ratios. RADA (4). Sport und Buch Strauß. Köln. p.139. (1996). [Have reviewed full text.](#)
41. Geyer, H., Schänzer, W., Mareck-Engelke, U., et al. Factors influencing the steroid profile. RADA (3). Sport und Buch Strauß. Köln. 95-113. (1996). USADA0951-USADA0960. [Have reviewed full text.](#)
42. **Hemmersbach**, P., Birkeland, K. I., Norli, J. R., et al. Urine storage conditions and steroid profile analysis. RADA (4). Sport und Buch Strauß. Köln. p.99. (1996). [Have reviewed full text.](#)
43. **Horning**, S., Geyer, H., Machnik, M., et al. Detection of exogenous testosterone by 13C/12C analysis. RADA (4). Sport und Buch Strauß. Köln. p. 275-283. (1996). [Have reviewed full text.](#)
44. **Kazlauskas**, R. Effects of DHEA on urinary steroids. RADA (5). Sport und Buch Strauß. Köln. p. 83. (1997). [Have reviewed full text.](#)
45. Kicman A. T., Oftebro, H., Walker, C., et al. Potential use of ketoconazole in a dynamic endocrine test to differentiate between biological outliers and testosterone use by athletes. Clin. Chem., 39 1798. (1993).
46. Kicman A. T., Brooks, R. V., Collyer, S. C., et al. Criteria to indicate testosterone administration. Br. J. Sport Med., 24, p. 253. (1991).
47. Lévesque, J.-F. and Ayotte C. The oral administration of DHEA: the efficiency of steroid profiling. RADA (7). Sport und Buch Straub, Köln. p. 213. (1999). [Have reviewed full text.](#)
48. **Lévesque**, J.-F. and Ayotte, C. Criteria for the detection of androstenedione oral administration. RADA (7). Sport und Buch Straub, Köln. p. 169. (1999). [Have reviewed full text.](#)
49. **Liu**, X., Zhang, Y., Wu, M., et al. The steroid profiles after oral administration of testosterone undecanoate with different doses. RADA (7). Sport und Buch Straub, Köln p. 311. (1999). [Have reviewed full text.](#)
50. Mareck-Engelke, U., Geyer, H., and Donike, M. Stability of steroid profiles. Proceedings of the 10th Cologne Workshop on Dope Analysis, 7th to 12th June 1992, M. Donike, H. Geyer, A. Gotzmann, U. Mareck-Engelke, S. Rauth eds. Sport und Buch Strauß. Köln. 87-89. (1993). USADA0927-0928. [Have reviewed full text.](#)
51. Mareck-Engelke, U., Geyer, H., and Donike, M. Stability of steroid profiles (4): The circadian rhythm of urinary ratios and excretion rates of endogenous steroids in female and its menstrual dependency. RADA (2), Sport und Buch Strauß. Köln. p.135. (1995). [Have reviewed full text.](#)
52. **Mareck-Engelke**, U., Geyer, H., and Donike, M. Stability of steroid profiles (2): Excretion rates from morning urines. Proceedings of the 11th Cologne Workshop on Dope Analysis, Köln. p. 85. 1994. [Have reviewed full text.](#)



53. Mareck-Engelke U., Geyer, H., and Donike, M. Stability of steroid profiles (3): Ratios and excretion rates of endogenous steroids in male urines collected over 24 hours. RADA (3). Sport und Buch Strauß. Köln. p.135. (1995). p. 121. (1995). USADA0939-0945. [Have reviewed full text.](#)
54. Mareck-Engelke, U., Geyer, H., Schindler, U., et al. Influence of ethanol on steroid profile parameters. RADA (3), Sport und Buch Strauß. Köln. p.143. (1996). [Have reviewed full text.](#)
55. Mareck-Engelke U., Flenker, U., and Donike, M. Stability of steroid profiles (5): The annual rhythm of urinary ratios and excretion rates of endogenous steroids in female and its menstrual dependency. RADA (3), Sport und Buch Strauß. Köln. p.177. (1995). [Have reviewed full text.](#)
56. Mareck-Engelke, U., Flenker, U., and Schänzer, W. Stability of steroid profiles (6): The influence of oral contraceptives on steroid profiles. RADA (4). Sport und Buch Strauß. Köln. p.139. (1997). [Have reviewed full text.](#)
57. Namba, O., Miyachi, Y., Irie, M., et al. Urinary testosterone and epitestosterone secretion in a doping positive subject. International Congress of Endocrinology, Kyoto. Abstract 16-22-324. (1988).
58. Palonek, E. and Garle, M. Single injection of testosterone to 7 volunteers: Results from this study. In Proceedings of the 10th Cologne Workshop on Dope Analysis. M. Donike, H. Geyer, A. Gotzmann, U. Mareck-Engelke and S. Rauth (eds.), Sport und Buch Strauß. Köln. p. 131. (1993). [Have reviewed full text.](#)
59. Raynaud, E., Audran, M., Brun, J. F., et al. False-positive cases in detection of testosterone doping. Lancet (Letter), 340 1468. (1992).
60. Schweizer, C., Cardis, C., Cauderay, M., et al. T/E ratio variations through puberty in male adolescents. Proceedings of the 14th Cologne Workshop on Dope Analysis, Köln. p. 159. (1997). [Have reviewed full text.](#)
61. Setiawati, E., Suyatna, F.D., Wiria, M.S., et al. Profile of urinary excretion in Indonesian volunteers after DHEA administration. RADA (9), Sport und Buch Straub, Köln. p. 287. (2001). [Have reviewed full text.](#)
62. Shackleton, C.H.L., Phillips, A., Chang, T., et al. Confirming testosterone administration by isotope ratio mass spectrometric analysis of urinary androstenediols. Steroids, 62: 379. (1997). [Have reviewed abstract.](#)
63. Shackleton, C.H.L., Roitman, E., Phillips, A., et al. Androstenediol and 5-androstenediol profiling for detecting exogenously administered dihydrotestosterone, epitestosterone, and dehydroepiandrosterone: Potential use in gas chromatography isotope ratio mass spectrometry. Steroids, 62. 665-673. (1997). USADA0753-USADA0761. [Have reviewed full text.](#)
64. Ueki, M. and Okano. Analysis of exogenous dehydroepiandrosterone excretion in urine by gas chromatography/combustion/isotope ratio mass spectrometry. Rapid Commun. Mass Spectrom. 13: 2237. (1999). USADA0762-USADA0768. [Have reviewed full text.](#)
65. Uralets, V. P., Gillette, P.A., and Latven, R.K. Over-the-counter anabolic steroids 4-androsten-3,17-dione, 4-androsten-3,17-diol and 19-nor-4-androsten-3,17-dione: excretion studies in men. RADA (6). Sport & Buch Strauss. p. 147; (1998). [Have reviewed full text.](#)
66. Uralets, V.P. and Gillette, P.A. (1999). Over-the-counter anabolic steroids 4-androsten-3, 17-dione; 4-androsten-3, 17-diol and 19-nor-4-androsten-3, 17-dione: excretion studies in men. J. Anal. Toxicol., 23: 357. Also in RADA (6). (1999). [Have reviewed full text.](#)
67. Uralets, V.P. and Gillette, P.A. New anabolic steroids available as nutritional supplements: 5-alpha-androstan-3, 17-diol, 1, 4-androstadien-3, 17-dione and 5 alpha-androst-1-en-17-ol-3-one. RADA (10). Sport und Buch Straub, Köln. p. 73. (2002). [Have reviewed full text.](#)
68. Van Eenoo, P., Delbeke, F. R., Desmet, N., et al. Excretion studies with 4-androstene-3, 17-dione. RADA (6). Sport und Buch Strauß. Köln. p. 171. (1998). [Have reviewed full text.](#)
69. Van Eenoo, P., Delbeke, F.T., Desmet, N., et al. Excretion studies with 7-keto-dehydroepiandrosterone. RADA (9). Sport und Buch Straub, Köln. p. 91 (2001). [Have reviewed full text.](#)
70. Wright, F., Lafarge, J. P., Antréassian, J., et al. In P. Hemmersbach and K. I. Birkerland (eds.). Long-term study of steroid and peptidic hormones in the plasma of healthy young men under controlled testosterone undecanoate therapy. In Blood Sample in Doping Control, Second International Symposium on Drugs in Sports. Lillehammer, Norway. p. 65. (1993).

## USADA Document References

71. Bowers, L.D. et al eds. Application of gas chromatography-combustion-isotope ratio mass spectrometry to doping control. Symposium. (2003). USADA0847-USADA0904. [Have reviewed full text.](#)
72. Cawley, A. et al. Isotopic fractionation of endogenous anabolic androgenic steroids and its relationship to doping control in sports. Journal of Chromatographic Science. 43. (2005). USADA0829-USADA0835. [Have reviewed full text.](#)
73. de la Torre, R., et al. Isotope ratio MS analysis of testosterone, in chemicals and pharmaceutical preparations. Journal of Pharmaceutical and Biomedical Analysis. 24. 625-650. (2001). USADA0742-USADA0747. [Have reviewed full text.](#)
74. Donike, M. Steroid profiling in Cologne. USADA0905-USADA0916. [Have reviewed full text.](#)
75. [Geyer](#), H., Mareck-Engelke, U., Schänzer, W., et al. The Cologne protocol to follow up high testosterone/epitestosterone ratios. RADA. Proceedings of the 11<sup>th</sup> and 12<sup>th</sup> Cologne Workshop on Dope Analysis. M. Donike, H. Geyer, A. Gotzmann, U. Mareck-Engelke, eds. Sport und Buch Strauß. Köln. (1993 and 1994). 107-125. USADA0961-USADA09070. [Have reviewed full text.](#)
76. Saudan, C, et al. Longitudinal profiling of urinary steroids by gas chromatography/combustion/isotope ratio mass spectrometry: Diet change may result in carbon isotopic variations. Journal of Chromatography B. 831. 327-330. (2006). USADA0786-USADA0789. [Have reviewed full text.](#)
77. Saudan, C, et al. Urinary analysis of 16(5 $\alpha$ )-androst-3A-ol by gas chromatography/combustion/isotope ratio mass spectrometry: implications in anti-doping analysis. Journal of Chromatography B. 810. 157-164. (2004). USADA0790-USADA0797. [Have reviewed full text.](#)

## Non WADA Document References

78. American Academy of Forensic Sciences. Toxicology Laboratory Guidelines. (2006). [Have reviewed full text.](#)
79. Baume, N., et al. Use of isotope ratio mass spectrometry to detect doping with oral testosterone undecanoate: inter-individual variability of 13C/12C ratio. Steroids. 71, 364-370. (2006). [Have reviewed full text.](#)
80. Caimi, R. J. & Brenna, J. T. Direct analysis of carbon isotope variability in albumins by liquid flow-injection isotope ratio mass spectrometry. Journal of the American Society for Mass Spectrometry, vol. 7, p. 605-610. (1996).
81. Caimi, R. J., Houghton, L. A., & Brenna, J. T. Condensed-phase carbon isotopic standards for compound-specific isotope analysis. Analytical Chemistry, vol. 66, p. 2989-2991. (1994).
82. CAS 2006/A/1057 UCI v/Barry Forde & Barbados Cycling Union. [Have reviewed full text.](#)
83. Catlin, D., et al. Testing urine for drugs. Journal of Automatic Chemistry. 14:3. 85-92. (1992). [Have reviewed full text.](#)
84. [Cawley, A.](#), et al. Preliminary results on the carbon isotope ratios of ketonic steroids in urine samples collected from different countries. RADA (11). Sport and Buch Straub, Köln. p. 183-193. (2004). [Have reviewed full text.](#)
85. [Cawley, A.](#), et al. Pure and applied aspect of carbon isotope ratio analysis in doping control. RADA (12). Sport und Buch Strauß. Köln. P. 231-240. (2004). [Have reviewed full text.](#)
86. [de la Torre, R.](#), et al. Urine Contamination by microorganisms and alterations in the endogenous steroid profile. A Prospective study. RADA (6). Sport and Buch Straub, Köln. p. 223-235. (1999). [Have reviewed full text.](#)
87. [de la Torre, R.](#), et al. Changes in androgenic steroid profile due to urine contamination by microorganisms: A prospective study in the context of doping control. Analytical Biochemistry. 289. 116-123. (2001). [Have reviewed full text.](#)
88. Ferry, M., et al. Influence of pregnenolone administration on IRMS analysis. RADA (8). Sport and Buch Straub, Köln. p. 209-214. (2000). [Have reviewed full text.](#)

89. Flenker, U. et al. Influence of dietary changes on the dynamics of  $^{13}\text{C}/^{12}\text{C}$  in selected urinary steroids. GASIR symposium. 9. (2005). [Have reviewed abstract.](#)
90. Flenker, U. et al. Influence of changes in diet on the dynamics of  $^{13}\text{C}/^{12}\text{C}$  in selected urinary steroids: Diet free from cholesterol. RADA (13). Sport and Buch Straub, Köln. p. 227-233. (2006). [Have reviewed full text.](#)
91. Flenker, U., et al., Measurement of  $^{13}\text{C}/^{12}\text{C}$ -ratios to confirm misuse of endogenous steroids. RADA (6). Sport and Buch Straub, Köln. p. 243-256. (1999). [Have reviewed full text.](#)
92. Goldberger, B., et al. Commonly practiced quality control and quality assurance procedure for gas chromatography/mass spectrometry analysis in forensic urine drug-testing laboratories. Forensic Sci Rev 9:25. 60-80. (1997). [Have reviewed full text.](#)
93. Goodman, K., et al. Curve fitting for restoration of accuracy for overlapping peaks in gas chromatograph/combustion isotope ratio mass spectrometry. Anal Chem. 66, 1294-1301. (1994). [Have reviewed full text.](#)
94. Hall, J. A., et al. Routine analysis by high precision gas chromatography mass selective detector isotope ratio mass spectrometry to 0.1 parts per mil. Rapid Communications in Mass Spectrometry, vol. 13, no. 13, pp. 1231-1236. (1999). [Have reviewed full text.](#)
95. Horning, S., H. Geyer, U. Fleckner, W. Schänzer, Detection of exogenous steroids by  $^{13}\text{C}/^{12}\text{C}$  analysis. RADA (5). Sport und Buch Strauß. Köln. p. 135. (1998). [Have reviewed full text.](#)
96. Jimenez, C., et al. Stability studies of testosterone and epitestosterone glucuronides in urine. Rapid Communications in Mass Spec. 20, p. 858-864. (2006). [Have reviewed full text.](#)
97. Jingzhu, W., et al. Delta values of different steroids. RADA (12). Proceedings of the Cologne Workshop on Dope Analysis. 241-250. (2004). [Have reviewed full text.](#)
98. Maitre, A., et al. Urinary analysis of four testosterone metabolites and pregnanediol by gc-cirms after oral administrations of testosterone. J Anal Toxicol. 28, 426-431. (2004). [Have reviewed full text.](#)
99. Mazzarino, M. et al. Effect of the Systemic vs. Inhalatory Administration of Synthetic Glucocorticoids on the Urinary Steroid Profile. RADA (12). Sport and Buch Straub, Köln. p. 45-54. (2004). [Have reviewed full text.](#)
100. Meier-Augenstein, W., Brand, W., Hoffmann, G. F., et al. Bridging the information gap between isotope ratio mass-spectrometry and conventional mass-spectrometry. Biological Mass Spectrometry, vol. 23, pp. 376-378. (1994).
101. Meier-Augenstein, W. Online recording of C-13 C-12 ratios and mass-spectra in one gas- chromatographic analysis. Journal of High Resolution Chromatography, vol. 18, pp. 28-32. (1995).
102. Meier-Augenstein, W. Applied gas chromatography coupled to isotope ratio mass spectrometry. Journal of Chromatography A, vol. 842, no. 1-2, pp. 351-371. (1999). [Have reviewed full text.](#)
103. Meier-Augenstein, W. Use of gas chromatography-combustion-isotope ratio mass spectrometry in nutrition and metabolic research. Current Opinion in Clinical Nutrition and Metabolic Care, vol. 2, no. 6, pp. 465-470. (1999). [Have reviewed full text.](#)
104. Merritt, D. A. and Hayes, J. M. Nitrogen isotopic analyses by isotope-ratio-monitoring gas- chromatography mass-spectrometry. Journal of the American Society for Mass Spectrometry, vol. 5, pp. 387-397. (1994).
105. Merritt, D. A. & Hayes, J. M. Nitrogen isotopic analyses by isotope-ratio-monitoring gas- chromatography mass-spectrometry. Journal of the American Society for Mass Spectrometry, vol. 5, pp. 387-397. (1994).
106. Mongongu, C., et al. Evaluation de la robustesse de l'analyse part GC/C-IRMS pour la détermination de l'origine des hormone stéroïdes. Validation d'un protocole analytique. Congrès de La Société Française de Spectrométrie de Masse. Poster. (2006). [Have reviewed poster.](#)
107. Molaioni, F., et al. Urine stability, steroid profile and T/E ratio: towards an index of sample degradation. RADA (13). Sport and Buch Straub, Köln. p. 187. (2006). [Have reviewed full text.](#)
108. Pujos, E., et al. Optimizing the extraction and analysis of DHEA sulfate, corticosteroids and androgens in urine: application to a study of the influence of corticosteroid intake on urinary steroid profiles. Anal Bioanal Chem. 380, 524-536. (2004). [Have reviewed full text.](#)

109. Skogsberg, U. et al. Investigation of the retention behaviour of steroids with calixarene-based stationary phases by modern NMR spectroscopy. *Journal of Separation Science*, vol. 26, p. 1119-1124. (2003). [Have reviewed full text.](#)
110. **Spirito**, E, et al. The role of measurement uncertainty in doping analysis. *Int. J Risk Assessment and Management*. 5 (2/3/4), 378. (2005). [Have reviewed full text.](#)
111. **Taylor**, R., et al. Validity of carbon isotope ratio measurements for decomposed urine samples. RADA (12). Sport und Buch Strauß. Köln. p. 491-495. (2004). [Have reviewed full text.](#)
112. U.S. Department of Health and Human Services. Bioanalytical method validation. May (2001). [Have reviewed full text.](#)
113. van der Veen, A.M.H. Measurement uncertainty and doping control in sport. *Accred Qual Assur*. 8. 334-339. (2003). [Have reviewed full text.](#)
114. **Ventura**, R., et al. Estimating uncertainties of results using information of internal quality control, intercomparison exercises and reference materials. RADA (11). Sport und Buch Straub, Köln. p. 131-140. (2003). [Have reviewed full text.](#)
115. **Werner**, **R.A.** and Brand W.A. Referencing strategies and techniques in stable isotope ratio analysis. *Rapid Communications in Mass Spectrom.*, **15**, 501-519. (2001). [Have reviewed full text.](#)

# **Part 2:**

# **Arbitrators, Attorneys, and**

# **Witnesses**

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# The AAA Arbitrators<sup>433</sup>

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## **Patrice M. Brunet**

Panel chair. A Montreal lawyer.

He was selected using a ranking system after the two other arbitrators could not agree on a third member.

A specialist in immigration law, Brunet has also served as legal counsel for the International Triathlon Union and as a Canadian Olympic Committee board member.

He has been seated on fewer USADA-convened doping arbitration panels than his two colleagues have.

He also sat on panels that upheld sanctions against U.S. archer Mark Hainline and cyclist James Mortenson, both for missed tests.

## **Christopher L. Campbell**

Landis selection.

This San Francisco Bay Area lawyer was a member of the 1980 U.S. Olympic wrestling team that did not compete due to the U.S. boycott. He subsequently retired due to injury.

After earning his law degree, Campbell returned to competition and won a bronze medal in freestyle wrestling at the 1992 Barcelona Games at age 37. Campbell won two NCAA championships at the University of Iowa and a world championship in 1981.

Campbell is perceived as sympathetic to athletes and has dissented from the majority ruling for conviction in two high-profile cases: cyclist Tyler Hamilton (2006) and figure skater Kyoko Ina (2002).

In the Ina case, which concerned a missed out-of-competition test, Campbell positioned himself as a critic of the system. He wrote that the USADA appeared to be “pursuing their goal with the very same self-destructive motivation of an athlete who intentionally dopes, i.e., win at all cost,” and termed the agency’s behavior “highly questionable.”

## **Richard H. McLaren**

USADA selection.

A London, Ontario lawyer, author, and professor, McLaren’s varied practice includes bankruptcy law, and he once sat on an international commission that decided insurance claims by Holocaust survivors and their families.

McLaren runs his own company, Innovative Dispute Resolution.

McLaren first became involved in sports jurisprudence as a salary arbitrator for the National Hockey League in 1992. Since then, he has been among the busiest arbitrators in North America. McLaren was on panels that heard doping cases brought against tennis players by the ATP (Association of Tennis Professionals), including Petr Korda, Guillermo Coria, and Guillermo Canas, and heard non-doping disputes that arose during the 1998 and 2000 Olympic Games.

McLaren was on Court of Arbitration for Sport panels that upheld convictions against British slalom skier Alain Baxter, Spanish cross-country skier Johann Muehlepp and Costa Rican swimmer Claudia Poll.

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<sup>433</sup> Reference: DeSimone, B. *Who will take part in the Landis hearing*. ESPN.com. <http://sports.espn.go.com/oly/cycling/columns/story?id=2865881>. Accessed Jun 2, 2007.

## Quote From Testimony

### *Arbitrator Campbell Questions USADA Attorney Young*

Regarding the WADA Code of Ethics (also called the WADA Code of Silence, and the WADA Omerta) which in this hearing applies to WADA lab directors, WADA employees, and the panel's own expert, Dr. Botrè:

“The Laboratory should not engage in testing or expert testimony that would call into question the integrity of the individual or the scientific validity of work performed in the anti-doping program.”<sup>434</sup>

MR. CAMPBELL: Mr. Young, I've got a question I want to ask you.

MR. CAMPBELL: I think you'll agree with me that this doping system that we have is supposed to be in place to protect the interests of athletes. And when I look at that issue—just athletes in general, not in particular an athlete—and you've got a code of ethics of laboratory directors that essentially states that they can't point out the mistakes of the lab, how is that—how does that protect the interests of athletes when they may be the only ones, given their expertise, that really knows when there's a problem?

MR. CAMPBELL: ...if you had a code of ethics that was a code of ethics, why wouldn't it say, you have an obligation to point out if there's a problem as opposed to say—say, you have an obligation, really, not to.

MR. YOUNG: It could say that. It certainly could say that.

MR. CAMPBELL: Well, I think it should.

MR. CAMPBELL: I think it's a real problem.<sup>435</sup>

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<sup>434</sup> WADA International Standard for Laboratories. Annex B, 3.3. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>435</sup> Question from Arbitrator Campbell to USADA lead attorney Young at the conclusion of his closing statement. AAA official arbitration transcript. p. 2024, line 11. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

## AAA Panel Expert

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### **Francesco Botrè**

Italian Anti-Doping Laboratory Director

### ***Conflict***

Like other WADA-laboratory employees and directors, Botrè is prohibited from assisting athletes in their defense.

“The Laboratory should not engage in testing or expert testimony that would call into question the integrity of the individual or the scientific validity of work performed in the anti-doping program.”<sup>436</sup>

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<sup>436</sup> WADA International Standard for Laboratories. Annex B, 3.3. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

# The AAA Arbitrators Fail

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American Arbitration Association (AAA) arbitrators were the first to adjudicate the case.

Landis and USADA both choose an arbitrator. Landis chose Christopher Campbell. USADA chose Richard McLaren.

A strike-out system was used to select the third arbitrator, the chair, Patrice Brunet.

The USADA arbitrator and the chair wrote the majority opinion (the award). The Landis arbitrator wrote a dissent.

From the beginning, it appeared that the USADA arbitrator and the chair were aligned against Landis. For example, in one particular motion by Landis, they denied the motion without consulting Campbell.

Shortly before the AAA hearing, to assist discovery, the Arbitrators appointed an “independent expert” to help in retrieving the electronic data files (EDFs) of Landis’s tests. The expert was *not independent*. Francesco Botrè, as Director of the Italian WADA-accredited laboratory, was WADA-bound by mandate *not* to assist the athlete.

Although Landis objected to this expert, he wanted access to the EDFs. He was faced with a Hobson’s choice: accept Botrè to help in retrieval of the EDFs or probably not get the EDF information.

Botrè’s role was later expanded to that of Panel advisor; and Landis was saddled with a WADA-lab director acting, in some ways, as a fourth member of the arbitration panel.

The panel missed many opportunities to notice and grasp the enormity of the lab’s mistakes.

Where the majority noticed mistakes, it ignored their importance. For example, the panel took note of the numerous non-forensic

cross-outs, and asserted that in the future such mistakes might exonerate an athlete.<sup>437</sup>

290. The Panel does, however note that the forensic corrections of the Lab reflect sloppy practice on its part. If such practises continue it may well be that in the future an error like this could result in the dismissal of an AAF finding by the Lab.

This panel ruling begs the question: If such mistakes would clear an athlete in the future, why not clear the athlete now?

As Circuit Judge William Hue wrote:<sup>438</sup>

“Landis’ rights under the Code were violated because he was not afforded:

- A timely hearing;
- A fair and impartial hearing body;
- The right of each party to present evidence, including the right to call and question witnesses;
- A timely, written, reasoned decision.

Landis’ rights were significantly compromised or unduly criticized in the flowing areas:

- The right to be represented by counsel at the Person’s own expense;
- The right to be fairly and timely informed of the asserted anti-doping rule violation;
- The right to respond to the asserted anti-doping rule violation and resulting Consequences.

For more on Hue’s analysis, and other press analysis and commentary of the arbitrator’s rulings, see page 408.

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<sup>437</sup> Majority award. ¶290. The opinions of the AAA panel are linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>438</sup> <http://trustbut.blogspot.com/2007/10/hues-review-serving-master.html>



# The CAS Arbitrators

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## David Williams

Panel chair, selected by CAS.

New Zealand lawyer and arbitrator.

[Resume link.](#)

## Jan Paulsson

Landis selection.

French attorney and arbitrator.

Chair of the CAS panel on [Landaluce](#).

[Resume link.](#)

## David Rivkin

USADA selection.

New York and London attorney and arbitrator.

Served on other CAS panels, including [Baxter v IOC](#) (the Vicks Inhaler case), Tyler Hamilton's appeal, [WADA and Cricket v. Asif and Akhtar](#), and [IAAF v Giungi](#).

[Resume link.](#)

# Landis's Attorneys

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## **Maurice Suh (AAA and CAS)**

Suh is a partner in the Los Angeles office of Gibson, Dunn & Crutcher. He has specialized in complex business litigation, fraud prosecutions, public corruption and official misconduct cases and environmental crime.

Suh is a former U.S. Attorney. He oversaw the development of the Homeland Security and Emergency Preparedness departments as Deputy Mayor of Los Angeles.

This is his first case involving a doping offense against an athlete.

[Resume link.](#)

## **Howard Jacobs (AAA)**

Jacobs has defended numerous prominent U.S. athletes against doping charges, including Tyler Hamilton, Marion Jones, Zach Lund, and Tim Montgomery.

Jacobs has also handled cases involving endorsement and team selection disputes.

Jacobs competed in track and field and cross-country at Florida State University and later as a professional triathlete.

When he interviewed for a job with the then-fledgling USADA, CEO Terry Madden suggested he look into representing athletes.

[Resume link.](#)

## **Daniel Weiss (AAA and CAS)**

Associate, Gibson, Dunn & Crutcher.

[Resume link.](#)

## **Paul Scott (AAA and CAS)**

Paul Scott is the former Director of Client Services at the WADA-accredited US laboratory at UCLA.

Like other WADA-laboratory employees and directors, Scott would have been prohibited from assisting athletes in their defense.

“The Laboratory should not engage in testing or expert testimony that would call into question the integrity of the individual or the scientific validity of work performed in the anti-doping program.”<sup>439</sup>

He left the laboratory in the fall of 2006, after reviewing Landis's document package from LNDD, to join Landis's legal team as an expert consulting witness.

Said Scott at the time:

“It is not a positive test. It would not have been a positive test at UCLA. I had to quit the lab if I was going to assist Landis.”

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<sup>439</sup> WADA International Standard for Laboratories. Annex B, 3.3. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

# Landis's Testifying Witnesses

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## Amory, John, MD

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### Andrologist

Associate Professor of Medicine  
Division of General Internal Medicine  
University of Washington  
[Resume link.](#)

### Summary of AAA and CAS Testimony

1. Multiple T/E ratios and LH (leutenizing hormone) values from Landis's urine samples before and after July 17<sup>th</sup> are clearly not consistent with the chronic use of testosterone.  
Since the T/E test is abnormal, and since studies show that this test remains abnormal longer than the IRMS test does in high-mode individuals, any other IRMS test abnormality in Tour de France is likely an error.  
Epitestosterone values are low and do not suggest epitestosterone doping to avoid detection.
2. Acute administration of testosterone is of no known physiological or psychological athletic benefit.
3. The documentation and chain of custody procedures for the Stage 17 sample suggest error.

### CAS Declaration Quotes

16. I became interested in this case because of my research interest in testosterone and its effects, and because the test results generated by the LNDD after Appellant's Stage 17 sample did not correspond with what I would have expected to see in a testosterone user. Nor did it make sense to me that an athlete in an endurance sport would have chosen testosterone to boost performance, given the absence of evidence supporting a link between testosterone use and either endurance or an accelerated recovery time. My interest in the case became heightened after reviewing the documents; not only did the lab results continue to puzzle me, but it was apparent to me that there had been many troubling irregularities in the handling of Appellant's sample.

17. In preparation for my testimony in this case, I was provided with the discovery documents produced in this case, including the laboratory documentation package prepared by the LNDD. I have also reviewed the briefs and the transcript of the hearing before the AAA Panel of arbitrators.

18. I made the decision to testify in this case on a pro bono basis. Prior to my testimony before the AAA Panel, I had probably spent 40-50 hours of time reviewing documents in this case and formulating my opinions. Since testifying, I have spent many additional hours preparing and refining my opinions, and in reviewing additional documents, including the transcript and the Appellee's Brief. I am not charging for my time in this case and I believe that to uphold an anti-doping sanction on the evidence in this case is morally and ethically wrong. <sup>440</sup>

39. The results of LNDD's analysis of Appellant's Stage 17 samples do not correspond with known science. <sup>441</sup>

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<sup>440</sup> Amory pre-CAS hearing declaration, pp. 5-6, ¶17-18.  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>441</sup> Amory pre-CAS hearing declaration, p. 16, ¶39.

# Davis, Simon, PhD

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## British Researcher

### IRMS Instrumentation Expert

Technical Director, Part Owner  
MS Solutions (IRMS manufacturer)  
United Kingdom  
[Company link.](#)

## Summary of AAA and CAS Testimony

- Simon knows the IRMS machine, he wrote part of the IsoPrime manual.

### ISL Violation<sup>442</sup>

- LNDD machines: improper set-up, no operating manual.
- Old software, old hardware.
- Improper pressure.
- Review of timelines, including gaps and data erasures.  
The printouts were done on the following day.
- Inadequate linearity testing.
- Lack of replicates.
- Lack of controls in the testing process.
- Very poor chromatography.  
Problems with peak identification.  
Problems with sloping baselines.  
Coelution.
- No baseline separation for internal standard.
- Absence of reference range population and validation.
- Inter- and intra-operator changes to peak start and finish, background points. Could see isotope numbers along the way.

- The lab techs reprocess every sample. Software allows moving peak start and end, and background points. Can obtain almost any results. The software allows one to save parameters and record one's work.  
LNDD did not save parameters. No documentation or record of work.

### ISL Violation

1. Changing the peak integration.

You can essentially make the system give you any number you want, and no one would be any the wiser.

ISL 5.2.6.1: "The Laboratory must have documented procedures to ensure that it maintains a coordinated record related to each Sample analyzed. In the case of an Adverse Analytical Finding, the record must include the data necessary to support the conclusions reported (as set forth in the Technical Document, Laboratory Documentation Packages). In general, the record should be such that in the absence of the analyst, another competent analyst could evaluate what tests had been performed and interpret the data."

ISL 5.4.4.1.4: "All data entry, recording of reporting processes and all changes to reported data shall be recorded with an audit trail. This shall include the date and time, the information that was changed, and the individual performing the task."

### ISL Violation

2. ISO17025-5.5.11.

Correction factors are software-dependent.

3. The newer software traces any changes that are made to the data post acquisition. For instance, if the software is re-processed with different integration parameters this would be recorded in all MassLynx and Ion vantage systems, but not in any OS2 systems.

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<sup>442</sup> For more on the significance of ISL and other violations, see page 16.

4. Newer software has fully documented and tested background subtraction routines. The method and validity of the background routines in the OS2 software is unknown and undocumented. All documentation of the OS2 routines was lost when Micromass purchased Isotech (the developers of the original software).
5. Newer software has improved peak detection – the true nature of the OS2 detection methods is unknown as no documentation remains as to the method used.

#### ***Batch Results Print Out***

- Pages are not printed out in order of batch run.
- Batch summary does not match subsequent pages.
- Information is not in the batch.
- Mix Cal Acetate delta run values do not match batch summary.
- Values or runs have been substituted in.

#### ***The Pressure Problem***

Out of pressure: Penning reading of 5.2.

May affect linearity. Long and short of it: Numbers become unreliable.

High pressure indicates a problem. There is no evidence of fault identification and repair.

#### ***Reinjection***

Reinjecting samples and controls *can* be okay, as long as work is documented. Here, “no idea what’s gone on.”

Samples were analyzed and reanalyzed. There is no record of what went on. LNDD did not save data.

“I’d sack an engineer who did this without documentation.”

#### ***OS2 Software Demonstration***

- Compared processing and reprocessing of saved files. Identical results. No confusion.
- Shows three different peaks 44 45 46 overlapping for identification. Initially showed difference of 8 delta units. By changing the baseline, or peak start and stop, delta values changed from +19 to –33.
- “Can make any number  $\pm 50$  as you want.”

#### ***Quotes From Testimony***

##### ***“Lab Work Totally Unreliable”***

Q. (By Mr. Suh) After having looked at all of the data, and the lab results of this case, have you come to any conclusions about whether or not the test results that you have seen are reliable or accurate?

A. “I think that they’re totally unreliable.”<sup>443</sup>

##### ***No Operating Manual***

“Mass spectrometers are not washing machines.” “It’s essential [to have an operating manual].”<sup>444, 445</sup>

##### ***Obsolete Software***

“OS/2 is a very good piece of software for its time. But its time was 1987.”<sup>446</sup>

##### ***Mickey-Mouse Ears***

“If your magnet is not right—you’re dead in the water.”<sup>447</sup>

<sup>443</sup> AAA official arbitration transcript. p. 1769, line 9.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>444</sup> AAA official arbitration transcript. p. 1790, line 11.

<sup>445</sup> AAA official arbitration transcript. p. 1790, line 6.

<sup>446</sup> AAA official arbitration transcript. p. 1820, line 22.

<sup>447</sup> AAA official arbitration transcript. p. 1785, line 12.

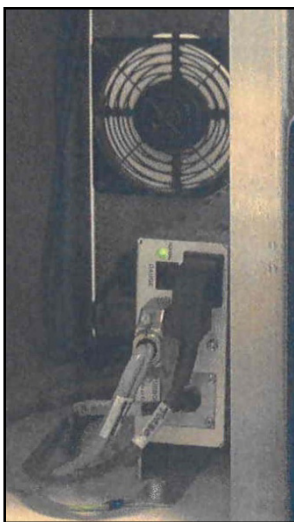
### ***The “Green Light” Lie***

Q. (By Mr. Suh) This deals with the issue, in their brief, they’re dealing with an issue of whether or not the IsoPrime was being run at the proper pressure, which we’ll get to in a moment.

A. “Okay.”

Q. And in response to this concern, do you see where it says, “The instrument has a built-in operating light which establishes that the instrument is operating within the correct pressure range. When the instrument is operating properly, a green light is displayed on the instrument. If the operating pressure becomes too high, the light turns yellow as a warning followed by red and instrument shutdown.” Exhibit 32 is three, color photographs of the LNDD IsoPrime instrument operating at a pressure of 5E-6 millibars with the green light display.

A. “Yes.”



**Figure 212. USADA Exhibit 32. The “green light” is in the center of the image.**

Q. Now, what do you think about the argument that this green light, right here, is a warning light, which—I’m quoting the brief—that if

the operating procedure gets too high, the light turns yellow, as a warning, followed by red, and instrument shutdown. What do you think of that?

A. “It shows a complete lack of understanding of that instrument. That—first of all, that light does not change color. It’s either green or off. That light—well, first of all, that unit is a control unit, a control unit which switches on and switches off the pumps which are used to create a vacuum. That green light refers to the speed at which the pumps are working, and it comes on when the pumps are operating at the correct speed. Now, if there’s a huge leak, the pumps will not be able to maintain the speed, and the green light will go out. But that will be a leak so large you can hear it. And we’re talking about leaks of—of atoms here. We’re not talking about of a gas flow; we’re talking about very minor leaks. That has nothing to do with pressure.”

Q. And does this light turn—change color?

A. “As I have just said, it does not. It either goes on or it goes off.”<sup>448</sup>

### ***Operators Unqualified***

Q. (By Mr. Suh) Did you come to a conclusion, based on your experience about the technicians’, Ms. Mongongu and Ms. Frelat’s, abilities and their competence to operate the IsoPrime1 and IsoPrime2 instruments?

A. “I think they clearly did not understand the instrument. And, as I said, I had to help them actually load the software on—sorry—the reprocessing data on. I had to help them load it onto the machine, and they were obviously trying to help each other during the reprocessing and generally did not seem to know how the software worked.”<sup>449</sup>

<sup>448</sup> AAA official arbitration transcript. p. 1787, line 1 to 1789, line 6.

Linked at: <http://arniebakerrecycling.com/books/wiki.htm>.

This testimony has not been refuted by any USADA experts.

<sup>449</sup> AAA official arbitration transcript. p. 1845, line 6.

***Operators Have No Basis for, or Record of, Manual Peak Integration or Manual Subtraction***

“Subjectively interpreting where to put those points is very, very difficult, and I don’t know how to do it. And I certainly don’t think the technicians at LNDD know how to do it. But we have seen the massively fluctuating numbers we get just from moving the points even a short distance. You know, we can have no confidence that the numbers are right. In essence, what we’re looking at is a very expensive, rather large random number generator.”<sup>450</sup>

***Fire Operators who Have Unexplained Time Gaps***

“If I had an engineer come back from the site where he’d run a series of analyses to test the specifications of instruments and there were time gaps and overrun samples, I would get very suspicious.”  
“An engineer who would do that would be sacked and has been in the past.”<sup>451</sup>

***LNDD Operators Have No Records to Document Their Work***

Q. (By Mr. Jacobs) Dr. Davis, you were not present in July or August of 2006 when the samples were originally run on Stage 17 at LNDD, right?

A. “That’s correct.”

Q. So do you have any way of knowing exactly what they did as far as the processing of the data back in July and August of 2006?

A. “Not only do I not have any idea, the lab technicians before the analysis also have no idea what they did.”<sup>452</sup>

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<sup>450</sup> AAA official arbitration transcript. p. 1882, line 8.

Linked at: <http://arniebakerrecycling.com/books/wiki.htm>.

<sup>451</sup> AAA official arbitration transcript. p. 1818, line 17.

<sup>452</sup> AAA official arbitration transcript. p. 1905, line 13.

# Goldberger, Bruce, PhD

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## GC/MS Expert

Forensic Toxicology Lab  
College of Medicine  
University of Florida

Professor Clinical Track  
Dept. of Pathology, U of Florida  
College of Medicine

President, American Academy of Forensic Sciences  
Editor-in-Chief, Journal of Analytical Toxicology  
University of Florida College of Medicine

[Resume link.](#)

## Summary of AAA and CAS Testimony

### ISL Violation<sup>453</sup>

- Expert in two areas:
  - (1) The operation and management of a laboratory and
  - (2) GC/MS testing.
- Lack of three-ion identification renders all GC/MS results void.
- The documentation shows no analysis of positive controls.
- Calibration issues. There is a problem with forcing the calibration curve to 0. This forces a fourth arbitrary point on the curve. This is particularly inappropriate and troublesome given the amount of background noise that is present in the chromatograms. Even though the lab relies on the T/E ratio as opposed to absolute values of T and E; this still matters, at least as related to lab competence.

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<sup>453</sup> For more on the significance of ISL and other violations, see page 16.

- Matrix interference is a significant issue. Interference in the T channel is definitely a problem. The blank urine chromatograms show peaks that are present in Landis's sample that are not present in the blank urine.
- The chain of custody documentation, wrong sample numbers, and improper correction of errors constitute violations of relevant rules and standards.

There are specific, mutually-exclusive chain of custody documents.

- ISO 17025 violation on paperwork cross-outs. Paperwork is just as important as data. Would fire someone for these types of corrections, because they cause you to question the overall abilities of the operator.
- Continuing education for his lab operators: weekly to monthly. For LNDD: none.
- The errors in laboratory procedures render the conclusions of this laboratory in relation to the results unreliable and unusable for the purpose of establishing a doping violation.

## Quotes From AAA Testimony

### *Poor Chromatography → Inaccurate Results*

Q. (By Mr. Jacobs) The B confirmation... at USADA 277. This is one of the replicates of the sample on the B confirmation.

A. "That chromatography's horrible."<sup>454</sup>

Q. Your testimony about the poor chromatography and the matrix interference issues, that goes to the accuracy of the results, right?

A. "Absolutely."

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<sup>454</sup> AAA official arbitration transcript. p. 1059, line 18.  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.



***Lab Work Fails Universal Standards***

Q. (By Mr. Jacobs) Is accuracy affected by whether you're accredited by WADA or ISO or the agency that accredits you?

A. "No, because you build on the standard of practice."

Q. Accuracy is accuracy, right?

A. "That's right."<sup>455</sup>

***Eminently Qualified as Expert***

***Offered Directorship of UCLA Anti-Doping Lab***

Q. (By Mr. Young) What—Okay. So you don't analyze samples for testosterone and epitestosterone. Before this case, how many times have you personally reviewed documentation packages reporting testosterone or epitestosterone?

A. "Once or twice. The funny thing, though, is just a week or two ago, I received an inquiry from Dr. Braun, who's the chairman at the pathology department at UCLA, and he writes to me..."

A. "Dr. Braun writes to me: 'In view of your training and considerable experience, I believe you may be interested in the following job opportunity. The department of pathology and laboratory medicine of the David Geffen's School of Medicine at UCLA is seeking a director for the Olympic analytical laboratory.' So he asked me to apply for that job despite, as you said, never running a T/E in my life."<sup>456</sup>

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<sup>455</sup> AAA official arbitration transcript. p. 1107, line 16.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>456</sup> AAA official arbitration transcript. p. 1096, line 7.

***Unlike LNDD, Keeps and Could Retrieve All Electronic Data Files***

Q. (By Mr. Young) Have you ever had an occasion in any of your cases where you've turned over the electronic data files on your GC/MS instrument to the other side?

A. "No one has ever asked, but if someone asked for an electronic data file dating back ten years, I could give it to them."<sup>457</sup>

***"Lab Work Totally Unreliable"***

Q. (By Mr. Jacobs) Do you have any confidence in the GC/MS testing for epitestosterone?

A. "None at all."<sup>458</sup>

***"The Worst Lab Work I've Ever Seen"***

Q. (By Mr. Jacobs) Let me ask you this: In all of your years, 20-plus years, in this field doing GC/MS testing on drugs, have you ever seen so many errors on a single sample?

A. "No."<sup>459</sup>

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<sup>457</sup> AAA official arbitration transcript. p. 1094, line 13.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>458</sup> AAA official arbitration transcript. p. 1090, line 7.

<sup>459</sup> AAA official arbitration transcript. p. 1090, line 12.

# Goodman, Keith, PhD

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## IRMS Expert

Senior Director  
Analytic Chemistry  
Xanthus Pharmaceuticals  
Cambridge, MA  
[Company link.](#)

## Summary of CAS Declaration

- Quality controls, as performed by LNDD, provide no assurance of accuracy.
  - Lab could not indentify its internal standard within its own acceptable isotopic quality control range.
  - Blank urine controls run in reprocessing demonstrate variances so great as to render useless their value as quality controls.
  - Mix Cal Acetate cannot serve as a positive control. It is a clean matrix, was not subject to sample processing, is missing three of six target analytes, and its isotopic values are not in positive range.
- LNDD instrument checks are of very low acceptance standards.
- No valid identification of testosterone metabolites.

## Summary of CAS Testimony

USADA spent little time questioning Goodman about the science.

USADA asked Goodman about his agreement with Meier-Augenstein's arguments.

USADA asked Goodman about his use of lifting rings on an IRMS machine a decade ago in the lab in which he was a student with Brenna.

# Landis, Floyd

## Respondent

### Summary of AAA and CAS Testimony

- Cycling background
- General denial
- Discussion of post Tour de France press statements
- Discussion of Geoghegan call to LeMond

### Positively False

Landis is simultaneously published his story, *Positively False*<sup>460</sup> with the first edition of *The Wiki Defense*.

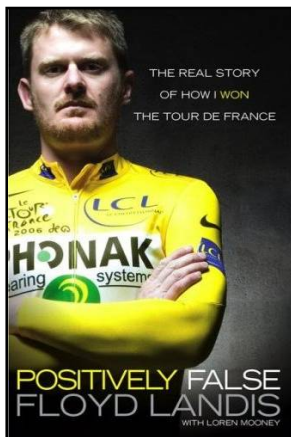


Figure 213. Book cover, Landis's autobiography, *Positively False*.

<sup>460</sup> *Positively False: The Real Story of How I Won the Tour de France* (Hardcover) by Floyd Landis (Author), Loren Mooney (Author). Simon & Schuster. June 26, 2007. <http://www.amazon.com/gp/product/1416950230?ie=UTF8&tag=arniebakercyc-20&linkCode=as2&camp=1789&creative=9325&creativeASIN=1416950230>.

### Quote From CAS Testimony<sup>461</sup>

CAS Hearing Transcript

Page 357

1 FLOYD LANDIS - CROSS  
2 Q. I want to be clear it's your  
3 testimony and your view of this case  
4 that the LNDD employees, the USADA  
5 employees, the previous two panel  
6 members who went against you must be  
7 corrupt liars?  
8 A. It is my testimony that  
9 somebody is lying, sir.

Arnie's comment:

I believe Landis has this right. See page 21.

### Quotes From AAA Testimony

#### *Denies Banned Drug Use*

Q. (By Mr. Jacobs) Did you ever use any performance-enhancing substances while you were riding for Mercury?

A. "No, I never have."<sup>462</sup>

Q. Did you ever use any performance-enhancing substances during your time with the Postal Service team?

A. "No."<sup>463</sup>

Q. Did you ever use any doping products while at Phonak?

A. "No."<sup>464</sup>

Q. Did you use any testosterone the night before Stage 17?

A. "No."

Q. Any banned substances that night?

A. "No."<sup>465</sup>

<sup>461</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>462</sup> AAA official arbitration transcript. p. 1269, line 17.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>463</sup> AAA official arbitration transcript. p. 1276, line 16.

<sup>464</sup> AAA official arbitration transcript. p. 1280, line 21.

<sup>465</sup> AAA official arbitration transcript. p. 1297, line 14.

### ***Discusses Post Tour Statements to Press***

Q. (By Mr. Jacobs) [I]n that statement that you read, said that the testosterone found was natural and produced by your own organism. Do you remember that?

A. "I do."

Q. Did you know what that meant?

A. "I still don't know what that means."

Q. Why did you read the statement if you weren't sure what it meant?

A. "I regret it. It was confusion at that point, and I really should not have taken the advice—the advice of the lawyers. I didn't—look, I didn't have anybody telling me what to do. I've never been in a position of that kind of scrutiny, even—even in a positive light, let alone being asked questions that I didn't have answers for. And so, I made a mistake. I regret it. And as you can see those guys aren't here today writing statements.

Q. There were also some reports shortly after that where you had talked about cortisone injections and the Jack Daniels that you had drank [sic] the night before and the possible effect of those on your drug tests?

A. "Yes."

Q. Do you remember that?

A. "I do."

Q. Can you explain what you were doing with those statements?

A. "I was doing what I was trying to do with you earlier: explaining what happened the day before. I really didn't have an explanation as to what had caused the test results. For that matter, I didn't even have the test results. I was forced into a position where I had to speak to the public without any information whatsoever. I—I really didn't

know whether there even was a positive test for that matter. All I had was a fax with a couple numbers on it.

Q. Your B sample was tested in early August, right?

A. Yes.

Q. How did you find out about the results of the B test?

A. The UCI made some kind of press statement, press release. I don't know. I went—I went to sleep.

Q. So you read about it on the Internet?

A. Yeah, it was—it was announced to the press before we were notified, yeah."<sup>466</sup>

#### **Arnie's comment:**

One of the first things Floyd did, after the public release of his allegedly positive test in July of 2006, was to try to figure out how his test could have been positive.

Floyd and others were thinking: "What might have resulted in a false positive?"

This initial thinking was misdirected. Although the T/E ratio test and the IRMS test have unacceptably high false-positive rates as interpreted by LNDD, a false-positive test is *not* the problem.

As you have seen, it is not about a false positive, it is about laboratory mistakes, from start to finish.

There are so many errors, that neither I, Floyd, nor anyone else connected with this case initially imagined the magnitude of the blunders we would uncover.

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<sup>466</sup> AAA official arbitration transcript, p. 1311, line 15.  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

***Discusses Geoghegan's Call to LeMond***

Q. (By Mr. Jacobs) Did you hear both ends of the conversation?

A. "No."

Q. From what you heard, approximately how long was the call?

A. "Oh, it was very short. It was—I wasn't sitting beside Will. I was sitting at the other end of the table, and I was playing with my Blackberry, and I heard him talking. And at first I thought he was just—he was not talking to anybody. And it went on for a very short period of time, and then it was over. And then it didn't really sink in that he had called anybody."

Q. Once you realized what had actually happened, were you disturbed by it?

A. "Yeah, it's awful. I—I—like I said, I was traumatized having him tell me that story in the first place. There's—there's very few things I could imagine happening to a person that would be worse than that, and I would—to make light of that is—I—I can't even put words to it."

Q. At the time that you understood the substance of the call, at that time, did you think that the publication of what Greg LeMond had told you about what happened to him in his childhood would be construed by him as some sort of a threat?

A. "No. And especially because he told me on the phone, that I was welcome to divulge it, even though I assured him I wouldn't—I was welcomed to do that, because he was—is currently writing a book about it. I don't know what the status of that book was but, nevertheless, the two didn't cross my mind at the time."<sup>467</sup>

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<sup>467</sup> AAA official arbitration transcript, p. 1323, line 21.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

# Meier-Augenstein, Wolfram, PhD

## IRMS Expert

Lecturer, Environment Forensics  
Queen's University  
Belfast, Northern Ireland  
[Resume link.](#)

## Summary of AAA Testimony

### ISL Violation<sup>468</sup>

- GC/MS must be coupled to IRMS for accurate identification. (See page 178.)
- Retention times aren't anything near the WADA spec (1% or 0.2 minutes) for matching the GCMS and the IRMS, impossible to know what one is looking at.
- Cannot determine peak identities.
- You need more than the 44/45 traces for proper identification, and we don't have them all.  
45/44 trace may show up chromatographic peaks, sometimes not.  
45/44 trace does not show constantly shifting baseline.
- Reviewed Brenna's research grant.
- Operators place no vertical lines showing start and stops of peaks.
- The chromatograms are poor. Read about USADA's own suggestions for chromatogram quality in USADA's 2<sup>nd</sup> symposium, page 85-86. Width and height criteria failures in this analysis are precisely the sort discussed in this article.
- It is easy for unclean peaks to have problems with background subtraction nibbling into true data.  
There is background signal underlying Landis's sample.

- Overlapping peaks often lead to skews between first and second peaks in reports that do not match the truth.
- Wandering internal standard values suggest something odd is going on that has not been diagnosed.
- No confidence in the data in terms of peak identification.
- Small peaks may matter if the isotopic composition of minor peak is strongly different.  
They can be fragments with isotopic values in the hundreds.
- Running a sample only once is not sufficient.
- Lost peaks can affect the integration and isotope results.  
Peaks disappear between GC/MS and GC/C-IRMS. This likely results in errors of measurement. For example, in USADA0171, several peaks merge into those on USADA0173. These merging substances contribute errors to the isotopic measurement.
- Peaks overlap. This can result in large delta differences. See Ricci: Acquisition and Processing of Data for IRMS. 1994.
- There is matrix interference.
- Peaks have long trailing tails.
- There are numerous downward sloping baselines.
- There is literature including the newly admitted Cologne study that says the delta-delta values should always be within 2.5 units.

### ISL Violation

- Peak identification is not up to WADA specification.
- Overlapping peaks result in incorrect delta values.
- The ratio variance between the samples as inferred from the other studies, including Cologne, strongly suggest there is some other substance included in the measurements.
- This other substance might account for the big 5 $\alpha$ -Adiol swings.

<sup>468</sup> For more on the significance of ISL and other violations, see page 16.

### ***Other Issues***

1. IRMS and positivity criteria.
  - a. Declaring a positive on one metabolite is inappropriate.
  - b. Comparison to other laboratory standards.
    1. UCLA.
    2. Australia.
2. LNDD has no reference range population.
  - a. Hemmersbach declaration (Laboratory method validation is important. GDC1352).
  - b. Variability between labs.
3. Control urine tests positive.
4. Reference gas calculation error reflects a failure of quality control.

### **Quotes From AAA Testimony**

#### ***LNDD: Bad Work Based on Assumptions***

Q. (By Mr. Suh) [The lab work.] It seems good enough, don't you think?

A. "No, I'm terribly sorry. If someone's life depends on it, or its career over, that it, it's in a court of law, that you might be sent to prison; you don't work on assumptions. You just don't."<sup>469</sup>

#### ***"Shooting Fish in a Barrel"***

##### ***Mix Cal Test is too Easy a Standard for a Positive Control***

A. "This is shooting fish in a barrel."

Q. (By Mr. Suh) When you say "shooting fish in a barrel, you mean it's easy to identify the Mix Cal Acetate?

A. "Yeah, it's very easy—this is not chromatographically challenging. Running human samples is exceedingly challenging."<sup>470</sup>

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<sup>469</sup> AAA official arbitration transcript. p. 1434, line 9.  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>470</sup> AAA official arbitration transcript. p. 1452, line 13.

### ***"Divine Intervention"***

#### ***Lab Has No Basis for Identifying its Own Internal Standard***

Q. (By Mr. Young) And where is it in the Paris laboratory's specs that says when you use the internal standard in connection with identifying retention time in a blank urine or athlete sample that it has to be within a particular delta value spec?

A. "How on earth would you know it is the internal standard? How do you define that? Can you explain this to me? I'm actually baffled. How do you know this peak out of five is the internal standard?"<sup>471</sup>

A. "How do they identify the internal standards?" "I don't know how they do it. Because, as I would say, there's nothing in the specs, so I don't know. Is it divine intervention or they just pick one?"<sup>472</sup>

### ***"You Have Lost Your Anchor"***

#### ***Relative Retention Time Wrong—No Way to Identify Internal Standard***

A. "LNDD did, in fact, have a 6 percent variation, right. And this is exactly what they shouldn't have. Because what you do on the left instrument, that you just catch—that actually identifies your peak. So what you do on the other instrument needs to match what you're doing on the first instrument within the specifications. Otherwise, you have no identification of the peaks."

"This is the whole point of relative retention time: so you can compare between instruments. What you have to do, even if you can't—even if you don't have the same—exactly the same GC, you definitely have to use the same column, the same temperature profile, the same helium profile. The moment you don't do that... you're going to have a problem. I can't actually tell you exactly where the problem lies. I can... tell you that in this instance, your

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<sup>471</sup> AAA official arbitration transcript. p. 1517, line 17.  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>472</sup> AAA official arbitration transcript. p. 1518, line 3.



relative retention times on the GC IRMS do not match the relative retention times on the GC/MS, and that is your instrument that identifies the peak. And since you're out—really out of the specification, *you have lost your anchor* on the GC/MS.”<sup>473</sup>

**“You Can Produce Any Number”**

***Poor Chromatography. Small Peaks can have Dramatic Effects***

Q. (By Mr. Young) Is there anything that you find in human urine that would have a carbon isotope ratio value of below minus 40?

A. “Who is to say that that peak comes from the human urine? Can you tell me this peak doesn't come from the matrix interference that has anything to do with this funny, let's say, forest of peaks down on the left? We don't know. We haven't even got the peak identification for this peak; we haven't got a mass spectra for this peak. Where is this peak coming from? It can be from the urine. Yes, perhaps. I don't know. It can be part of that. Considering that your baseline value of all of this matrix interference is unbalanced, minus 54, in cases minus 129, as per the data sheets that was used by LNDD, don't you think that minus 129 might have a large effect?

Q. You're saying that this peak could have an effect—could have a carbon value of minus 129.

A. “Yes, possibly.”

Q. Tell me something in nature that has a carbon value of minus 129.

A. “It doesn't have to be in nature, my dear friend. If you have incomplete combustion, you can produce virtually any number on this—on the carbon scale and down to where you see it—you would never see in nature.”<sup>474</sup>

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<sup>473</sup> AAA official arbitration transcript. p. 1509, line 19.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>474</sup> AAA official arbitration transcript. p. 1488, line 20.

**“USADA Comparing Apples and Pears”**

***Diol Delta/Delta Values Should Parallel One Another  
Landis's Values Don't Make Sense as a Doping Positive***

Q. (By Mr. Young) When you looked at your three studies and you said that there were never more than a two difference between alpha and beta—did you notice this particular data point?

A. “Yes, I did.”

Q. “And that's a lot more than two, right?”

A. “Yes, indeed. But as it so happens, this is not a difference between pregnanediol and 5-alpha or pregnanediol and 5-beta. This is a difference between 11OHA which, according to the study, is 11 hydroxy androsterone... we're looking at the differences between pdiol and the 5-beta, and pdiol and 5 alpha. This is not pdiol.”

Q. It's a different exogenous reference compound.

A. “Yes. But... this is not comparing like for like. All those studies reported differences between pdiol and 5-beta, and pdiol and 5-alpha. You're now trying to compare apples with pears. This is not the—this is not the difference that's been published in three studies, and this is not a difference that is here, highlighted.”

“You're here not comparing numbers from a measurement that corresponds to anything in the papers published by Shackleton or by Aguilera or, indeed, the values that are in question here. The values in question are the delta/delta differences between pdiol and 5-alpha, and pdiol and 5-beta.”

“Apart from that, this is one—one volunteer out of two volunteers.... I'd like you to—I'd like to see any peer-reviewed journal accepting a study on N equals 1.”<sup>475</sup>

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<sup>475</sup> AAA official arbitration transcript. p. 1524, line 22.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.



# USADA Attorneys

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## **Richard R. Young**

Young is a partner of the law firm Holme, Roberts & Owen. This firm is USADA's outside counsel.

Experienced in the area of sports law, and doping specifically, Young helped draft the WADA code and has also served as an arbitrator for various sports' national governing bodies.

Young has led several high-profile prosecutions of athletes, including the cases involving Chryste Gaines, Tyler Hamilton, and Tim Montgomery.

[Resume link.](#)

## **Matthew S. Barnett**

At the time of the AAA hearing, also from the law firm Holme, Roberts & Owen.

At the time of the CAS hearing, started a new law firm.

His specialties include antitrust, labor, health care, and sports law.

[Resume link.](#)

## **Daniel J. Dunn**

From the law firm Holme, Roberts & Owen.

His practice is primarily environmental law.

[Resume link.](#)

## **Jennifer Sloan**

Associate, Holme, Roberts & Owen.

[Resume link.](#)

# USADA Testifying Witnesses

## Ayotte, Christiane, Dr.

### Canadian Anti-Doping Laboratory Director

#### Conflict

Like other WADA-laboratory employees and directors, Ayotte is prohibited from assisting athletes in their defense.

“The Laboratory should not engage in testing or expert testimony that would call into question the integrity of the individual or the scientific validity of work performed in the anti-doping program.”<sup>476</sup>

Ayotte has publicly stated: “When rich athletes and American lawyers fight against the validity of tests and controls, we better be creative!”<sup>477</sup>



Figure 214. USADA expert-witness Ayotte. Picture from jobboom article. “When rich athletes and American lawyers fight against the validity of tests and controls, we better be creative!”

Arnie’s comment:

Scientists and experts should fight for truth: *for* the validity of tests and controls if scientifically sound, and *against* laboratory reports that are deficient.

<sup>476</sup> WADA International Standard for Laboratories. Annex B, 3.3. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>477</sup> Translation from French: “Quand des athlètes et de riches avocats américains se battent contre la validité des tests et des contrôles, on a intérêt à être créatif!” <http://www.jobboom.com/jobmag/2005/v6n6/v6n6-06g.html>. Accessed May 1, 2007. Also, GDC01354.

## Original AAA Overall Opinion for USADA: All Okay<sup>478</sup>

CAS Hearing Transcript Page 802

4 And do you have an opinion on  
5 whether the results reported by the Paris  
6 laboratory on the 17th Stage sample are  
7 reliable?  
8 A. Yes. I found that the IRMS results  
9 were consistent, of very good quality, and that  
10 the T/E value estimated and confirmed by LNDD  
11 was fully in agreement and coherent with the  
12 IRMS result. So it was -- I confirmed that it  
13 was reported on good scientific basis and  
14 ground.

## Self-Conflicting CAS Testimony

### *Recognized T/E Ratio ISL Violation, Said Nothing*

Ayotte testified at AAA hearing that she was comfortable with the T/E ratio test results.<sup>479</sup>

At the CAS hearing, Ayotte stated she knew “that [LNDD] had not followed the rules: the ISL and the technical documents.”<sup>480</sup>

For more information about this T/E ratio ISL violation, see page 152.

Arnie’s comment:

Ayotte therefore knew and did not inform the AAA panel that the LNDD’s T/E test *was in violation* of the ISL and technical documents.

## *Calls the ISL Rule a “Recommendation”<sup>481</sup>*

In defending her testimony before the AAA Panel that she was comfortable with the T/E ratio test as performed by LNDD,<sup>482</sup> Ayotte testified in the CAS proceeding that obtaining three diagnostic ions was only *recommended* by the ISL and the technical document and that LNDD’s failure to obtain three ions, or at least produce evidence of compliance, *was not a violation*.

“I view it as not in line with what the ISL and the technical document is recommending.”<sup>483</sup>

CAS Hearing Transcript Page 1292

4 A. Well, you call it a  
5 violation. I say that how the lab  
6 acquired it and what the lab decided to  
7 do in confirming that finding was not a  
8 -- the interpretation -- that their  
9 interpretation was not in line with  
10 what the ISL recommended. So I did not  
11 -- no, and I don’t view this in my mind  
12 as a violation.  
13 Q. You don’t view in your mind  
14 the LNDD laboratory’s failure to follow  
15 the single ion monitoring ISL, the SIM  
16 requirement in the ISL as an ISL  
17 violation?  
18 A. I view it as not in line  
19 with what the ISL and the technical  
20 document is recommending.

<sup>478</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>479</sup> AAA official arbitration transcript. p. 826, lines 11-15.

<sup>480</sup> CAS official arbitration transcript. p. 1297, lines 8-10.

<sup>481</sup> International Standard for Laboratories. See page 269.

<sup>482</sup> AAA official arbitration transcript. p. 826, lines 11-15.

<sup>483</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

After further questioning, Ayotte admitted LNDD's T/E test was in violation of the ISL and technical documents.<sup>484</sup>

CAS Hearing Transcript

Page 1295

6 A. That -- no. You asked me,  
7 your question, sir, was that they did  
8 not acquire the three ions. And I can  
9 see -- I could see in the documentation  
10 package that the ions were acquired.  
11 Q. But they did not report  
12 them?  
13 A. They did not report them.  
14 Q. So you don't know what  
15 values the diagnostic ions were at if  
16 they didn't report them?  
17 A. No, we don't know it.  
18 Q. And that is a violation of  
19 the ISL?  
20 A. Yes.

Arnie's comment:

I view this series of comments as evidence of deceiving and contradictory testimony.

### ***Accreditation Close Enough***

At the AAA hearing, Ayotte indicated that accredited method EC24C was the method used by LNDD for the T/E ratio.<sup>485</sup>

This is not true. The method used was the unaccredited EC24D.<sup>486</sup>

When confronted with this fact in Goldberger's CAS declaration, Ayotte responded that it was her opinion that the EC24D method did not need to be accredited because it was a "complement" to EC24C.<sup>487</sup>

Arnie's comment:

I do not agree.

The particular method must be accredited. As USADA's attorney, Young himself pointed out at a pre-AAA hearing conference:<sup>488</sup>

Pre-AAA Hearing Transcript

Page 101

4 The next thing that happens in this process is  
5 that the international standard says that for me to be  
6 using this method, I need to get it ISO certified. And  
7 they don't just ISO certify the lab -- I mean, they do ISO  
8 certify the lab -- but they also **ISO certify particular**  
9 **methods** that are employed by the lab. [Emphasis added.]

<sup>485</sup> AAA official arbitration transcript. p. 831, lines 12-15.

<sup>486</sup> Goldberger pre-CAS hearing declaration, p. 28, ¶76.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>487</sup> Ayotte pre-CAS hearing rebuttal declaration, pp. 19-20, ¶43.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>488</sup> The Pre-AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>484</sup> The CAS hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

### ***Chain of Custody***

When Ayotte prepared her declaration in this case, she adopted the AAA panel's statement that documents existed that allowed her to trace the movement of the A and B bottle the entire time.

Specifically she "was able from the different documents provided by the laboratory, to follow who had possession of the bottles..."<sup>489</sup>

This was proven impossible given the contradiction between LNDD1590 and LNDDI591.

(For a discussion of this and other chain-of-custody issues, see page 93.)

When confronted with this fact in Goldberger's declaration, Ayotte responded that she knew this contradiction all along, but did not see that as causing any doubt as to the location of the samples.<sup>490</sup>

#### **Arnie's comment**

Apparently, Ayotte noticed chain-of-custody errors, and assumed they were not problems. As discussed in more detail in the *Chain of Custody* section, beginning on page 93, she had no evidence that one contradictory document was right and the other wrong. She had no way of knowing who had the sample bottle, when he or she had it, or where the sample bottle was at a particular time.

### **Summary**

Arnie's comment:

In my view, Ayotte is the quintessential WADA-lab apologist. She consistently approves and endorses what happened at the lab until she is caught out by the facts. Even then, prohibited from assisting athletes, she carefully crafts and manipulates her testimony to deflect and deceive.

Why didn't USADA call LNDD Laboratory Director Ceaurriz, instead of Ayotte, to answer for the laboratory's inadequacies?

In my view, Ayotte's apparent waffling demonstrates a bias in the WADA system and supports Floyd's arguments.

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<sup>489</sup> Ayotte pre-CAS hearing declaration, p. 8, ¶19.

<sup>490</sup> Ayotte pre-CAS hearing rebuttal declaration, pp. 12-13, ¶28.

# Brenna, Thomas, Dr.

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## IRMS Expert

Professor, Division of Nutritional Sciences  
Cornell University  
Ithaca, New York, USA

[Resume link.](#)

## Not a Credible Witness for USADA

- Currently funded to \$1.2 million by USADA.<sup>491</sup> This represent about 10% of the grant monies Brenna has received in the last 18 years.<sup>492</sup>
- Brenna had discussions with Larry Bowers, Chief Science Officer of USADA, in the few weeks before his CAS testimony about receiving a new grant.<sup>493</sup>

## Summary of AAA Testimony

- Agrees that values in retesting process that are different than those obtained originally.
- Agrees that rewriting of data files erases previous results. (Is a world-class expert on software for IRMS machines.)
- MassLynx software better than manual processing method.
- Not familiar with OS2 software.
- Would include measure of uncertainty, contrary to USADA statements.
- Gives a figure of  $1.8 \times 10^{-9}$  mA as lowest level of linearity check—which does not fit the low outlined in the IsoPrime manual.

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<sup>491</sup> CAS official arbitration transcript, p. 955, line 23 to p. 956, line 18.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>492</sup> CAS official arbitration transcript, p. 961, lines 1-6.

<sup>493</sup> CAS official arbitration transcript, p. 956, line 19 to p. 958, line 10.

- States in first examination that relative retention times from GC/MS crucial for analyte identification. Then changes testimony as a rebuttal witness to state that Mix Cal Acetate is sufficient. On cross-examination, has no answer to how the 5-alpha androstanediol can be identified—since it is not present in the Mix Cal Acetate.

## *Disagrees with USADA About Measurement Uncertainty Wiggles to Avoid Any Disagreement With USADA/LNDD*

USADA had said the laboratory was not required to consider measurement uncertainty in its analysis.

In questioning about a reprocessed blank (control, negative) urine returning a value of 3.65 delta units, Brenna first opined that uncertainty should be considered—and so that value would not be an AAF.

When faced with the USADA statement that uncertainty does not apply, he prattled.

The following is presented as just one example of how USADA's experts attempted to benefit USADA and finesse the truth rather than give clear, accurate testimony.

For more on this deception, see page 60.<sup>494</sup>

AAA Hearing Transcript	Page 353
12	Q. Do you -- let me ask it this way:
13	When you look at this particular difference, do
14	you see that it now exceeds the minus 3 per mil
15	standard?
16	A. It exceeds minus 3 per mil; it
17	doesn't exceed minus 3.8, which would be the
18	threshold for declaring it positive.
19	Q. Are you aware that USADA in their
20	brief argue that the minus .8 measure of
21	uncertainty does not apply to the final
22	reporting of the per-mil value?
23	A. I don't recall that.
24	Q. Hold on a second. I'd like to show
25	you what USADA says in their brief.

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<sup>494</sup> The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

1 Do you see paragraph 91, right here?  
 2 A. Yeah, I see 91.  
 3 Q. Do you see the highlighted portion.  
 4 I will read it for you: "Under the ISL and the  
 5 applicable technical documents, LNDD's statement  
 6 and its conclusion was correct because LNDD was  
 7 not required to take into account uncertainty in  
 8 the measurement of its IRMS delta values."  
 9 Do you see that?  
 10 A. I see it.  
 11 Q. It sounds like you disagree with  
 12 that statement when you just applied the .8  
 13 measure of uncertainty.  
 14 A. I'm not willing to say I disagree  
 15 with it, but I -- you've read it and --  
 16 Q. Why aren't you willing to --  
 17 A. Well, because I don't really know  
 18 what he said, what he means, so I'm not saying I  
 19 agree or disagree. I'm simply saying that the  
 20 measurement of uncertainty as I was led to  
 21 understand it of .8 was applied.  
 22 Q. It's your testimony that you don't  
 23 understand what this sentence means. You don't  
 24 under- --  
 25 A. I don't know the ISL rules, and so I

1 can't --  
 2 Q. Well, you understand that it's  
 3 LNDD's -- that USADA has taken the position that  
 4 LNDD -- I will underline it for you -- oh, wait  
 5 a minute. I'm going to use this thing.  
 6 "LNDD was not required to take into  
 7 account the uncertainty of the measurement of  
 8 the IRMS delta values."  
 9 Do you understand now that your  
 10 calculation now, that it's not adverse, because  
 11 it's not within -- when you take into account  
 12 the point -- the .08 measurement of uncertainty,  
 13 it doesn't fall above minus 3, that that  
 14 contradicts USADA's position on this?  
 15 A. I'm not USADA. I don't have a  
 16 position.  
 17 Q. I'm not asking you whether or not  
 18 you are USADA.  
 19 A. You're asking me --  
 20 Q. I'm asking you whether or not you  
 21 understand that your statement contradicts --

22 it's a pretty simple question. You said that  
 23 this -- what you've done, sir -- oh, erase.  
 24 What you've done is, you've said  
 25 this minus 3.65 is not adverse because when you

1 subtract minus .8, the measurement of  
 2 uncertainty, it doesn't go above 3.  
 3 A. I did say that, yes.  
 4 Q. Right. And then I show you this,  
 5 and you tell me you don't understand what this  
 6 means. And my only response is I don't  
 7 understand what you mean. It says, "LNDD was  
 8 not required to take into account uncertainty in  
 9 the measurement of IRMS delta values."  
 10 So my question to you is, do you  
 11 agree or do you disagree with USADA's position  
 12 on this statement?  
 13 A. I think I've answered the question.  
 14 Q. I don't think you have, sir. I  
 15 don't think you have. Do you agree, or do you  
 16 disagree?  
 17 A. Well, I'm not going to --  
 18 Q. You're not going to disagree with  
 19 anything USADA says today, are you?  
 20 A. I'm answering the question you  
 21 asked. And I've given you the answer. I've  
 22 given you my answer.  
 23 MR. SUH: I'm going to ask the Panel  
 24 to direct the witness to answer the question,  
 25 because I don't believe he has. I've asked him

1 whether or not he agrees or disagrees with their  
 2 statement, and he says he won't.  
 3 MR. YOUNG: May I respond to that,  
 4 Mr. Chair?  
 5 MR. BRUNET: Yes.  
 6 MR. YOUNG: What this says is that  
 7 the applicable technical document does not  
 8 require that uncertainty be taken into account.  
 9 If he wants the witness to read the applicable  
 10 technical document which talks about which are  
 11 threshold substances and which are not threshold  
 12 substances in the context of the brief, that's  
 13 fine.  
 14 But that is what the statement in  
 15 the brief says. And I don't see whether -- what  
 16 he's really asking the witness is: Does the

17 applicable technical document require this or  
18 not? And he's not showing him the applicable  
19 technical document or even asking him about the  
20 applicable technical document.  
21 MR. SUH: I'm sorry, but that's not  
22 what I'm asking. I'm asking a very simple  
23 question. I'm asking whether or not he agrees  
24 or disagrees with the statement that LNDD was  
25 not required to take into account uncertainty of

AAA Hearing Transcript

Page 358

1 measurement.  
2 MR. BRUNET: And you would be  
3 required or not required by the applicable  
4 technical document.  
5 MR. SUH: Well, let's make it easy  
6 then. I'll flip this over, and I'll ask you the  
7 question without the brief.  
8 Q. (By Mr. Suh) Do you agree or  
9 disagree that the final value reported here  
10 should take into account measurement of  
11 uncertainty?  
12 A. I think it should take into account  
13 the measurement of uncertainty.

## CAS Testimony: No Known ID Criteria for Blank Urine

When Brenna was asked whether if he recalls any documents in which the target compounds were identified in the blank urine pool, Brenna responded that he "didn't make a specific note of that, [he] assume[d] that if they did blank urine - - if [he] saw a blank urine analysis that that would be the practice for it."<sup>495</sup>

## Self-Conflicting CAS Testimony

### *Quality of Chromatography*

At AAA hearing, Brenna testified that he spent considerable time reviewing the chromatograms in this case (indeed, based on his review he made several conclusions that the chromatograms were of good quality) and yet, while he presents himself to be skilled in the CIR test, testified that the internal standard was a quality control.<sup>496</sup>

In his pre-CAS hearing declaration, Brenna testified: "Upon inspection of chromatograms it is clear to anyone skilled in GCC-IRMS that the 5a-androstanol acetate chromatography reference standard delta value is measured as outside the +/- 0.5 permil value because of unresolved interfering substances."<sup>497</sup>

Brenna's most recent statements are in contradiction to his own conclusions drawn nine months earlier.

After his earlier testimony concerning the robustness of LNDD's quality control measures is shown to be in error, he changed his testimony.

<sup>495</sup> CAS official arbitration transcript, p. 1023, line 24 to p.1024, line 4. .

<sup>496</sup> AAA official arbitration transcript, p. 305, line 4 to p.309, line 21.

<sup>497</sup> Brenna pre-CAS hearing rebuttal declaration, p. 3, ¶7.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.



### ***Role of Retention Times in Identification of Analytes***

In the AAA proceeding, Brenna stated that the target peaks in the GC/C-IRMS chromatogram are identified because they have retention times *that match* the peaks in the GC/MS chromatograms for the same fraction.<sup>498</sup>

In the CAS proceeding, Brenna changed his testimony. He stated that the retention times of the GC/MS peaks *should not match* the peaks in the GC/C-IRMS chromatograms<sup>499</sup> and that identification occurred by matching the peak patterns in the GC/MS and the GC/C-IRMS chromatograms.<sup>500</sup>

When this contradiction was presented, he stated that these different processes “seem to be descriptions... of very similar processes.”<sup>501</sup>

Brenna is unwilling to concede the obvious contradiction in his testimony.

### ***Internal Standard as a Quality Control***

At the AAA hearing, Brenna assumed the internal standard to be a quality control. During the CAS proceedings, Brenna “assumed” it was not.

Brenna said that his testimony before the AAA Panel was supported by an “unwarranted” “assumption.”<sup>502</sup>

When he was cross-examined about why he now believes the internal standard is not a quality control, Brenna stated that he is “assuming that based on my experience.”<sup>503</sup>

When shown the USADA discovery response in which USADA stated that the internal standard is a quality control, Brenna refused to admit that it would cause him concern about his testimony that the internal standard was not a quality control.<sup>504</sup>

When pressed, Brenna said that because the discovery response says measured value, he would interpret the response as stating that the internal standard is a quality control.

In response to the panel, Brenna stated: “I interpret measured value not as the retention time which he could be referring to, but as to delta value... but if he has said this is used as a quality control for our delta value and if those are out then we toss the run, then that would be in contradiction.” Question by Panel: “To what you understand?” Answer by Brenna: “That’s right”<sup>505</sup>

Brenna made contradictory statements about this issue; contradictory statements where at least one statement must be false. Read about these statements on page 70.

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<sup>498</sup> AAA official arbitration transcript, p. 255, lines 18-22.

<sup>499</sup> Brenna pre-CAS hearing declaration, p. 9.

<sup>500</sup> Brenna pre-CAS hearing declaration, pp. 12 to 15.

<sup>501</sup> CAS official arbitration transcript, p. 1000, lines 10-19.

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<sup>502</sup> CAS official arbitration transcript, p. 969, lines 2-3.

<sup>503</sup> CAS official arbitration transcript, p. 981, lines 19-21, p. 982, lines 9-13.

<sup>504</sup> CAS official arbitration transcript, p. 984, line 18 to p. 985, line 16.

<sup>505</sup> CAS official arbitration transcript, p. 987, line 6 to p. 988, line 2.

### ***Different Columns Would/Would Not Have Effect***

The issue of whether or not the LNDD laboratory used the same or different columns in the GC/MS and GC/C-IRMS portions of the CIR test is important.

For details about this issue, see page 188.

Brenna first stated that if two different columns were used, then the operator would immediately notice because the order of the peaks would be different, and it would be immediately noticeable based upon the results of the IRMS test.<sup>506</sup>

In his rebuttal declaration, and at the CAS hearing, Brenna testified about a study he performed using the two different columns at issue. Brenna then states (entirely inconsistently) that he ran a test with these particular two different columns, and the elution order was the same. He provided no data about this study.<sup>507</sup>

### ***Role of Lifting Rings***

The hypothesis is that iron-lifting rings may alter the accuracy of the IRMS instrument. Used in transport, they should be removed before machine use.

For the details about this issue, see page 242.

Brenna testified that while he did not know what effect the lifting rings had on the IsoPrime2 instrument, he saw data that showed the lifting rings on the IsoPrime 1 instrument had no effect on the analysis: “There are data in the doc packs indicating that the lift rings on the IsoPrime 1 didn’t have any effect.”<sup>508</sup>

Landis has never argued that LNDD improperly left the lifting rings on the IsoPrime1. LNDD did not have lifting rings on the IsoPrime1.

Landis’s argument has always been that the lifting rings were on IsoPrime2.

Although there were no lifting rings on IsoPrime1, Brenna testified confidently that there was data in the document packet that showed the lifting rings, which did not exist, had no effect.

Brenna again testifies to facts about which he has no personal information. His facts simply do not exist.

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<sup>506</sup> Brenna pre-CAS hearing declaration, pp. 15 to 17.

<sup>507</sup> Brenna pre-CAS hearing rebuttal declaration, p. 8, ¶19.  
official arbitration transcript, p. 1001, line 4 to p. 1002, line 17.

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<sup>508</sup> CAS official arbitration transcript, p. 1087, lines 13-15.

## Conflicting Testimony With Other USADA Experts

### *Validation Studies for Positivity Criteria*

Brenna testified that he did not expect any validation studies to have been conducted by LNDD with respect to their positivity criteria of 3 delta units or about their uncertainty of 0.8 delta units.<sup>509</sup>

This is inconsistent with the testimony of Ayotte before the AAA Panel in which she testified that despite WADA issuing a suggested positivity criteria, the laboratory should validate the positivity criteria with respect to their particular method.<sup>510</sup>

### *Validation Studies for Controls*

Despite the logical and common-sense problem of having quality controls with acceptance criteria of 3-out-of-4 target compounds, but positivity criteria of 1-out-of-4 target compounds, Brenna testified that he did not believe a laboratory had to validate this plan to ensure accurate and reliable results were being obtained.<sup>511</sup>

### *Manual Processing as a Mechanical Process*

Brenna testified that the manual integration was a mechanical process.

However, there are significant differences between some of the reported delta-delta values and the reprocessed delta-delta values when this supposedly “mechanical” process was used.<sup>512</sup>

At the AAA, Brenna testified that the differences in reprocessing of result differences by manual method with same software and same analyst would have been of concern in his lab.<sup>513</sup>

## Appearance of Bias

At the CAS hearing, when USADA expert-witness Matthews made a point about his interpretation of the data, I watched as Brenna raised and pumped both his fists in the air and said: “Yes!”

### Summary

Arnie’s comment:

Brenna is a widely-respected authority on IRMS.

Brenna contradicts the briefs written by USADA’s attorneys.

Brenna contradicts other USADA witnesses. Brenna contradicts himself.

In my view, Brenna’s self-interest in receiving funding from USADA and his apparent waffling demonstrates his bias and supports Landis’s arguments.

Brenna’s fist-pumping at the CAS hearing was shocking and entirely unprofessional.

At these hearings, Brenna lost my respect.

<sup>509</sup> AAA official arbitration transcript, p. 1017, line 23 to p.1019, line 4.

<sup>510</sup> AAA official arbitration transcript, p. 856, line 13 to p. 858, line 4.

<sup>511</sup> CAS official arbitration transcript, p. 1019, line 21 to p.1020, line 9. .

<sup>512</sup> CAS official arbitration transcript, p. 1077, lines 16-20. See also page 122.

<sup>513</sup> AAA official arbitration transcript, p. 353, lines 8-18.

# Buisson, Corrine, Dr.

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## IRMS Laboratory Supervisor

Laboratoire National de Dépistage du Dopage (LNDD)  
Châtenay-Malabry, France

LNDD employee. Called by Landis.

## Conflict

Like other WADA-laboratory employees and directors, Buisson is prohibited from assisting athletes in their defense.

“The Laboratory should not engage in testing or expert testimony that would call into question the integrity of the individual or the scientific validity of work performed in the anti-doping program.”<sup>514</sup>

## Summary of AAA Testimony

- Former employer had newer software (MassLynx) to improve the accuracy of instrument.
- Did not train Frelat or Mongongu.
- Showed and explained SOP to Frelat. Then Mongongu took over training and showed Frelat what to do if Frelat had questions.
- Background subtraction rarely right on OS2... because chromatography poor.

## Summary

Arnie's comment:

Buisson's testimony contributed little to the case.

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<sup>514</sup> WADA International Standard for Laboratories. Annex B, 3.3. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

# Catlin, Don H., Dr.

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## Former USA Anti-Doping Laboratory Director

Professor Emeritus of Molecular and Medical Pharmacology  
Former Founder and Director  
UCLA Olympic Drug Testing Lab  
Los Angeles, CA  
[Resume link.](#)

## Conflict

Catlin retired as UCLA Laboratory Director in March, 2007.

Like other WADA-laboratory employees and directors, Catlin was previously prohibited from assisting athletes in their defense.

“The Laboratory should not engage in testing or expert testimony that would call into question the integrity of the individual or the scientific validity of work performed in the anti-doping program.”<sup>515</sup>

## Summary of AAA Testimony

- Has limited knowledge of the operation of the instruments used in his facility. Relied on his staff to manage the analyses, and to bring to him accurate reports for his approval.
- Landis *not positive by UCLA criteria.*
- *Was not permitted to testify against other labs.*
- *Did not look at all the chromatograms. There are chromatograms he would not have approved of in his own lab. Was only looking for the good ones.*

## AAA Cross Examination

- If you had obtained the same results:  
*We would find this case negative.*
- High sloping baseline. Not an expert. I don’t know.  
*I don’t deal with those things. My people do this.*
- Rates some chromatograms ‘C’ on an ABC or ABCD system. Rates ‘B’ sample. Stage 11, F3 fraction, as ‘C minus.’
- To my knowledge—never delete data once sequence starts.  
*We don’t delete real data.*
- Zack Lund case. Before the case started was told not testify for athlete by Olivier Rabin, WADA scientific director.
- Longitudinal profile *not* consistent with use of designer steroids.

## Quotes From AAA Testimony

### *Landis Would be Negative at UCLA*

Q. (By Mr. Suh) If you would obtain the same results, leaving aside a moment whether or not they were accurate... you would not declare these results as an adverse analytical finding when you were head of UCLA laboratory.

A. “[T]hose criteria, if they’re applied to this case, would find it negative.”<sup>516</sup>

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<sup>515</sup> WADA International Standard for Laboratories. Annex B, 3.3. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

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<sup>516</sup> AAA official arbitration transcript. p. 1220, line 18.

***Catlin Knows Some of the Principles...***

Q. (By Mr. Suh) Your testimony was that good chromatography is very important to you, accurate results, right?

A. "Yeah, sure."

Q. Sloping baselines can affect what was a part of good or bad chromatography, right?

A. "I'll agree to that, yes."<sup>517</sup>

***...But Not the Details***

Q. (By Mr. Suh) You don't know what causes a sloping baseline?

A. "I don't wish to discuss it."

Q. Why not?

A. "It's just something I don't wish to discuss."

MR. BRUNET: Dr. Catlin, you have to answer the question.

A. "I told him I don't know the answer."

MR. BRUNET: If you don't know, you can tell him you don't know, but you have to answer the questions.

A. "I did say I don't know."

MR. BRUNET: Well, that's not what I heard.

A. "Oh, sorry. I don't know."<sup>518</sup>

***Relies on Staff To Perform Tests***

A. "I don't want you—I don't want you to get the idea that I'm an idiot about sloping baselines... It's not where I am comfortable. I don't deal with those things. The people in my lab that read the data and set the criteria for when the slope begins and ends, or decide whether the sample has to be redone or reinjected, are doing it on a day-to-day operational basis, and I'm overseeing them and watching them...They just proceed and get it done."<sup>519</sup>

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<sup>517</sup> AAA official arbitration transcript. p. 1228, line 9.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>518</sup> AAA official arbitration transcript. p. 1226, line 8.

<sup>519</sup> AAA official arbitration transcript. p. 1228, line 2.

***Rates Many LNDD Chromatograms as Poor***

Q. (By Mr. Suh) I'd like to show you what's been marked LNDD 894.... In your experience and/or your judgment, is this one of the good chromatograms or one of the bad chromatograms that you've seen?

A. "It's one of the less good ones."

Q. [L]et's give it a grade, you know, like, we're in school, because you are a professor.

A. "That's a C, out of an A, B, C system."<sup>520</sup>

Q. When you look at the chromatography, and you say they are not good, or could be better—well, let me ask: Are they not good: Yes or no?

A. "Well, I think we're getting to needing to look at an individual chromatogram. I've seen a lot. Some of them are very good. Some of them could be better."

Q. And are there others that fall into another category?

A. "I'm sure there are, but I didn't really look at them."

Q. "What would that other category be?"

A. "Well, lower than very good."

Q. Lower—

A. "Mediocre."

Q. How about bad?

A. "Poor."

Q. Some of them were poor.

A. "I mean, you know, I didn't go through and classify all of them. I was looking for the good ones."<sup>521</sup>

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<sup>520</sup> AAA official arbitration transcript. p. 1229, line 7.

Linked at: <http://arniebakercycling.com/books/wiki.htm>

<sup>521</sup> AAA official arbitration transcript. p. 1214, line 19.

***Given Grief by WADA for Assisting an Athlete***

Q. (By Mr. Suh) You testified earlier that you received a lot of grief for testifying in the Zach Lund case?

A. “Yes.”

Q. And what was the source of that grief?

A. “I don’t think WADA was very happy.”

Q. And would that have been Olivier Rabin?

A. “I don’t think he was very happy.”

Q. And do you not think he was very happy because he called you or contacted you immediately before the hearing in the Zach Lund case?

A. “This was before the case started, and it was just made very clear to me that it was probably not a good idea for me to do this.”

Q. And who is Olivier Rabin?

A. “Olivier is the director of science.”<sup>522</sup>

***Deleting Files Does Not Occur at UCLA***

Q. (By Mr. Suh) In your lab, do you acquire data as part of your IRMS sequence, and, once it’s obtained, is it ever deleted for any reason when it’s being run in sequence?

A. “Not that I know of.”

A. “[W]e don’t delete real data.”<sup>523</sup>

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<sup>522</sup> AAA official arbitration transcript. p. 1242, line 24.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>523</sup> AAA official arbitration transcript. p. 1238, line 5.

***Landis’s Longitudinal Files Do Not Fit Profile of Designer Steroids***

Q. (By Mr. Campbell) Exhibit—is it 30? Now, this looks similar to—I think you called it a “steroid profile” over a number of years for Mr. Landis. This looks similar to some others that I’ve seen before.

A. “Yes.”

Q. Could you tell—starting from Paris in 6-16-02, up to the Paris in—up to the time he tested positive, whether any of his steroid profiles would be something that you would consider irregular, other than the one for the positive test here?

A. “I can’t say that. I have looked at parts of it in detail. The parts I’ve looked at it in detail are the T and the epi-T and the T/E. No, you can’t make—I can’t make any conclusion about whether this represents somebody taking a designer steroid. The kind of suppression I’ve seen would not be consistent with this. But there are at least two, and probably maybe 22, different types of genetic people that respond differently to steroids. We know two so far. And neither one of those are—are anything I can identify here.”<sup>524</sup>

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<sup>524</sup> AAA official arbitration transcript. p. 1255, line 19.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

Arnie's comment:

Catlin, an icon and a pioneer in the anti-doping arena, started his testimony opining that everything was fine, thought that the case demonstrated doping, and that the LNDD laboratory did excellent work.

As a former laboratory-director, perhaps no longer bound by the "WADA code of ethics," (and unlike Ayotte, above, see page 372), on cross-examination Catlin readily acknowledged failings of the LNDD's work, including poor chromatography.

He also testified that the results would not be classified as an adverse analytical finding (positive doping test) at UCLA.

He refused to climb-aboard when USADA attorney Young invited him to say he would not have become involved had he not been convinced that this was a positive case.

Tellingly, he more or less simply stated: You asked me to testify. When you ask, I do.<sup>525</sup>

AAA Hearing Transcript Page 353

9 Q. Okay. And if you weren't strongly  
10 convinced that it was a positive case, is there  
11 anything that could have made you come here and  
12 testify today?  
13 A. Well, when you asked me -- or USADA  
14 asked me to testify, and I have been involved in  
15 the case, I testify. When I start into a case,  
16 I have no preconceived notion about how it's  
17 going to go. I get a pile of paper, and I start  
18 to go through it, and we begin to talk, and the  
19 case develops.

Catlin did not appear at the CAS hearing. I wonder if he will ever again be asked to testify on behalf of USADA.

Here is another perspective, the view of David Bower, "Mr. TBV," who watched Catlin's testimony:

### The Curious Cross of Catlin<sup>526</sup>

When direct examination of Don Catlin was completed, it seemed like that of any other WADA lab director. The work is good, results correct, move on.

But then, under cross-examination, he said a lot of curious things that left a lot of loose ends, and seemed rather ambivalent towards the current USADA and WADA regimes.

He dryly offered up that WADA lab accreditation required good "citizenship," meaning not to testify against your neighbors.

Suh was almost shocked he was going there this easily. This was not like getting the other directors to talk. Maurice asked about the lab ethics standards, and Catlin offered, "yes, I wrote them."

Suh noted, "how opportune", and went right to the section about testimony. Catlin looked and, barely, prompted, offered:

"It seems to have changed since I wrote it."

He went easily to the "grief" he'd gotten from WADA Science Director Olivier Rabin while testifying for USADA in the Zach Lund case, because he did not believe Finestra should be on the prohibited list.

In the sense of coerced testimony, Catlin's presentation would be the basis of an argument that a lab director's testimony has no credibility in a doping case, because it is only allowed to take the party line: Everything is fine, looks good to me, no problem!

How many times have we heard that already in this hearing?

Catlin felt that in all the cases he'd referred to USADA as positives and won were solid and the athletes were cheaters, so the one-sided victory rate was justified, because his lab's work is good.

On positivity criteria, he danced on a tightrope, letting neither side get the unambiguous answers they desired. He said he'd have reported the Landis S17 as a "positive by the WADA criteria", but noted that it would not be positive by the criteria used by UCLA, presumably based on their validation studies.

Both sides can take hope from that USADA, in a legalistic definition of WADA positivity that Catlin admitted, and Landis in that his own criteria would not support it, and previous admission by Ayotte that labs must run validation studies for their methodologies.

<sup>525</sup> The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>526</sup> Trust But Verify Blog. Reprinted with permission. <http://trustbut.blogspot.com/2007/05/curious-cross-of-catlin.html>. Accessed May 28, 2007.



On chromatograms and background subtraction and co-elution, Suh tried to get him to say something specific, but he eluded simple characterization. He suggested he was impressed that LNDD could do certain things he could not do in his own lab, but the thing was somewhat lost, and the import unclear.

What I thought I heard, was that he was talking about algorithmically removing the contributions of co-eluted peaks to give an accurate result. I think he was saying that his lab didn't know how to do that algorithmically. Was he saying that LNDD could? I don't think LNDD does—he may very well have been saying that LNDD has co-eluted peaks that are presented as being deconvoluted, and he doesn't know how they do that. It would be impressive if they did.

He might be saying they are co-eluted, and convoluted, and LNDD doesn't know it, and is passing them off as pure peaks, but in a dryly sarcastic, round-about way that it can't be considered a criticism. They do "impressive" work, is what he said, after all. How is that criticism?

He graded some of the relevant chromatograms as poor, and gave some key ones letter grades of "C" and "C-", which was fairly condemning, but also a "passing" grade.

He admitted he had not heard all the testimony over the week, and did not contradict Suh's qualification, "if the data are right..." in his interpretation of the result values.

Young could not get him to admit the case was totally slam dunk, and while leaving the impression he thought Landis was guilty, his statements seemed couched and qualified, suggesting a quantitative bullet could yet turn the tide. I'm sure that is what Suh is hoping.

On the front of reality, we also have discovered the case against Steve Alfred, identified by USADA here as the likely subject of a test offered in redacted form by Landis. USADA reported a sanction on the case in Feb 2007, based on a result passed on to USADA from UCLA that UCLA did not consider positive by their own criteria. Alfred did not heavily contest the case, for reasons known only to him, but USADA clearly claimed a positive for testosterone in their reporting of the case.

This clearly demonstrated that USADA was applying looser criteria for the prosecution than UCLA felt is justified by the science. This seems not to concern USADA at all. They are, in fact, proud of it.

While going through this, I came to the conclusion Catlin wanted to:

- Indicate his commitment to science based anti-doping.
- Indicate his displeasure with some parts of WADA, and send some signals about it.
- Make it clear that there was some seriously substandard work being done.
- Not let Landis off because of his testimony, unless the numbers are really wrong, which he doesn't much doubt.
- Discourage other athletes and USADA from calling him as a witness, ever again.

It was a fascinating bit of testimony from a shrewd and ethical man.

# Frelat, Claire

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## Analytical Chemist

Laboratoire National de Dépistage du Dopage (LNDD)  
Châtenay-Malabry, France

## Conflict

Like other WADA-laboratory employees and directors, Frelat is prohibited from assisting athletes in their defense.

“The Laboratory should not engage in testing or expert testimony that would call into question the integrity of the individual or the scientific validity of work performed in the anti-doping program.”<sup>527</sup>

## Testimony: Not a Credible Witness

- Trained on the job by Mongongu.
- First allowed to work on samples late February 2006. Yet earlier in February she was responsible to show the COFRAC accreditors how the LNDD laboratory performed its tests.
- Regarding chain of custody; The transfer is not written. There is no record of how the sample is transferred.
- Admits that there is no record of what she did; that we would not know without her testimony.
- No SOP or validation for the method she uses to identify compounds in IRMS. See pages 88 and 180.
- Unable to explain time gaps and rewriting and deletion of files, for example mix cal acetate. See pages 123 and 249.
- In order to assess the need for manual processing, she looks at the 45/44 traces. However, those traces and the start, stop, and background selection points for manual processing are not recorded in the document package. Moreover, the start, stop, and

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<sup>527</sup> WADA International Standard for Laboratories. Annex B, 3.3. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

background selection points are not recorded in the electronic data files or anywhere else.

## ISL Violation<sup>528</sup>

ISL 5.4.4.3.1:<sup>529</sup>

“The Laboratory must establish criteria for identification of a compound *at least as strict* as those stated in any relevant Technical Document.”

- Frelat states there is no documentation as to the method she uses in IRMS compound identification.

## ISL Violation

ISL 5.2.6.1:<sup>530</sup>

“The Laboratory must have documented procedures to ensure that it maintains a coordinated record related to each Sample analyzed. In the case of an Adverse Analytical Finding, the record must include the data necessary to support the conclusions reported (as set forth in the Technical Document, Laboratory Documentation Packages). In general, the record should be such that in the absence of the analyst, another competent analyst could evaluate what tests had been performed and interpret the data.”

- Frelat testified that she cannot check for matrix interference without the 45/44 traces. The traces are not included in the document package. Therefore another analyst could not evaluate the data.

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<sup>528</sup> For more on the significance of ISL and other violations, see page 16.

<sup>529</sup> WADA International Standard for Laboratories. 5.4.4.3.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>530</sup> WADA International Standard for Laboratories. 5.2.6.1.4. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

## Quotes From AAA Testimony

### *There is No Chain of Custody*

#### *USADA Tries to Stall Cross-Examination*

Q. (By Mr. Suh) Now, looking at this form, which is USADA 254, show me on the form where it shows that you received—excuse me. Let me reask that question. Show me on the form where it records the transfer of the sample to you.

A. “The transfer is not written, but it is written that at 11:03 I received the bottle.”

Q. Well, the form reads, if I’m not mistaken, that at 11:03, the aliquot occurred, correct?

A. “In order to do the aliquot, I have to have the bottle in my hand.”

Q. Certainly. But where does it show the time or how that you received the bottle, the transfer? In other words, not that you did the process, but where does the form show that the transfer occurred from operator 18 to you?

MR. DUNN: May I interpose an objection. The witness just stated that in order to do the function she already said she did, she had to have received the bottle. So you have asked it answered—you’ve asked it, and she has answered.

MR. SUH: It’s actually not right.

Q. The question was, where on the form does it show the time or how or any other data about the intra—intralaboratory transfer? How it go from 18 to 26? Not that she had it at 11:03 and did the aliquot. Of course, she had to have it. But the chain of custody is from—is the process she—by which the sample moves through the laboratory. We know that—that the form here records where and when certain things were done to the sample; but where does the form record how the bottle moved through the laboratory through each of those steps?

A. “The transfer is not recorded, is not written.”

Q. And why don’t you now look through what is Exhibit—Exhibit 25 and find for me any document that shows, once again, the intralaboratory transfer in this process, any document. Exhibit 25 is the lab pack for the B sample.

MR. DUNN: I’m sorry. Could you repeat that for me? I didn’t catch it.

MR. SUH: Why—can we have the question read back?  
(Reporter complies.)

MR. DUNN: I guess I—my—my request would be that when you say “the process,” you’d be more specific, because there are a number of processes involved.

Q. The process by which the sample moved through the intralaboratory transfers from stage to stage, which is listed out here in the 1, 2, 3 operations that are set there. Find for me a document that shows how the sample moved through the laboratory in each of these tests.

A. There is no—there is no registration or entry with respect to how the sample is transferred. There are entries which pertain to who received the bottle at what time, and when, and where.

Q. In other words, information, just like the information we have up here, which is the operator, the time and date in which an operation was performed, and what operation it was, correct?

A. Yes.

Q. But nothing else?

A. No.<sup>531</sup>

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<sup>531</sup> AAA official arbitration transcript. p. 689, line 1.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

***Does Not Understand Level of Significance, or Cannot Support Personal View***<sup>532</sup>

Q. (By Mr. Suh) What do you believe is a significant difference in carbon isotope—in carbon isotope ratio testing for your final per mil value for any target isotope? What do you think—what do you believe is a significant result?

A. "... 1.5—1.5, 1.6 per mil.

Q. So, to your mind, a significant difference is 1.5 or 1.6 per mil?

A. "Yes."

Q. And can you point to an SOP in front of you where it defines a significant difference as about 1.5 or 1.6 per mil?

A. "It's not written—it's not written anywhere—my answer was really concerning myself."<sup>533</sup>

***Knew it Was Landis's Sample She Was Testing***

Claire Frelat, in testing the 'B' sample:

A. "Once the analysis of the B sample was done, Mr. Landis' name had already appeared in the press."

Q. So you're saying that when you did this test, you knew that the IRMS test that was being done on this sample was Floyd Landis'?

A. "Yes, the B; yes, I did know that."<sup>534</sup>

**Summary**

Arnie's comment:

Frelat's testimony documents the LNDD laboratory's specific failure to establish the identify of compounds in Landis's IRMS test.

Frelat's testimony documents the laboratory's generally sloppy practices.

Frelat's testimony documents some of the many violations of the laboratory's own SOPs as well as the WADA's International Standard for Laboratories.

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<sup>532</sup> This testimony did not make sense. TD2004EAAS defines 3.0 delta/delta units as significant for an adverse analytical finding. The SOP defines the LNDD measurement uncertainty as 0.8 delta/delta units. The value of 1.5 seems to appear out of the blue.

<sup>533</sup> AAA official arbitration transcript. p. 729, line 11.  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>534</sup> AAA official arbitration transcript. p. 718, line 3.

# Garcia, Myriam

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## Analytical Chemist

Laboratoire National de Dépistage du Dopage (LNDD)  
Châtenay-Malabry, France

## Conflict

Like other WADA-laboratory employees and directors, Garcia is prohibited from assisting athletes in their defense.

“The Laboratory should not engage in testing or expert testimony that would call into question the integrity of the individual or the scientific validity of work performed in the anti-doping program.”<sup>535</sup>

## Summary of CAS Testimony: Not a Credible Witness

- Testified via speaker-phone.
- Role was to testify about her memory concerning chain of custody issues more than one-and-one-half years earlier.
- Could not remember signing a witness declaration two weeks before the CAS hearing.

Read more about this on page 45.

## Summary

Arnie’s comment:

USADA presented Garcia to strengthen deficiencies in the chain of custody. Garcia was to remember and testify about the transfer of Landis’s ‘A’ sample bottle early in its handling at the LNDD laboratory.

LNDD has tested roughly 15,000 samples since Landis’s ‘A’ sample. The bottle in question was anonymous. It was number-coded. It was not a particularly special sample bottle in any way.

It is not credible that Garcia could have recalled the handling of this particular sample bottle.

I do not believe that Garcia wrote an important document rebutting the declaration of Landis witness Goldberger two weeks before the CAS hearing.

I can imagine USADA preparing chain-of-custody statements for the LNDD laboratory operators to sign. I can imagine that Garcia may or may not been asked to sign a statement prepared for her. If so, she should have read it. If so, she should have immediately recalled it on questioning at the CAS hearing.

USADA attorneys should have prepared their witness for testimony. USADA should have assured that Garcia had all relevant documents in front of her.

Shame on USADA for placing this LNDD operator in such a position.

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<sup>535</sup> WADA International Standard for Laboratories. Annex B, 3.3. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

# Jumeau, Janine

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## **IRMS Technical Writer**

Undergraduate Degree

EuroVector, Part-time technical manual production

Italy

[Company link.](#)

## **Summary of CAS Testimony**

- Helped develop hardware and software for the IsoChrome, an IRMS machine that preceded the IsoPrime, the machine used at LNDD.
- Wrote much of IsoChrome operating manual.
- Major role in testimony was to attest that linearity of the LNDD machine was within specification.
- Jumeau claims that the sections of the IsoPrime manual that disagree with her testimony that linearity was okay do not apply, though she was the one who wrote the sections that were incorporated into the manual.

# LeMond, Greg

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## Three-Time Tour de France Champion

### Summary of AAA Testimony

- LeMond stated that Landis said or implied that he (Landis) had doped during the 2006 Tour. The call was on August 6, 2006 and lasted 36 minutes.
- Landis-manager Will Geoghegan called the night before (LeMond's testimony). The call involved LeMond's history of childhood sexual abuse. LeMond felt he was being threatened.
- LeMond brought his attorney and refused to answer any questions on cross-examination about similar charges he leveled against Lance Armstrong.

### Quotes From AAA Testimony

#### *LeMond Refuses to Answer Questions*

#### *His Accusations Parallel Those Against Lance Armstrong*

MR. MC LAREN: We're going to allow the cross-examination to proceed. So go ahead, Mr. Jacobs.

Q. (By Mr. Jacobs) I'd like to go back to the deposition that you gave in the arbitration matter with Lance Armstrong. In that deposition, you testified that Lance Armstrong told you that everyone used EPO; is that correct?

MR. MANNING: And if I may object, here, I'm going to instruct my client not to answer that question.

MR. MC LAREN: Do you have any basis for objecting?

MR. MANNING: There's not a legal basis, but I don't believe this is a proper line of questioning at this hearing. And the current state of affairs for Mr. LeMond and Mr. Armstrong in other issues means that he should not answer these questions at this time.

MR. MC LAREN: Mr. LeMond, it's the Panel's obligation in this proceeding to ask you to answer your questions. I understand your attorney's position. And so I take it you're not going to answer the questions; is that correct?

MR. LEMOND: I'm not. I just want to say that Mr. Jacobs and this Panel can get depositions, my depositions. I said everything under oath, and it's — it's been published. It's been — it's on the record. Nothing to hide on any of that. I was under oath, and — but this is really about my conversation with Floyd.

MR. JACOBS: Here's the problem. I — I cannot be limited in that way, given that he has been called to testify as to a conversation. And as I indicated previously, it's very similar to the Lance Armstrong situation, and that's entirely relevant to this case. So, I'm not going to be in a position where I only get to ask those questions which Mr. LeMond's counsel feels is appropriate for him to answer. I get to cross-examine him, unless the Panel says otherwise. Otherwise his testimony comes out completely.<sup>536</sup>

### Summary

#### Arnie's comment:

Landis's ex-manager, Will Geoghegan's despicable action the night before LeMond's testimony provoked great media interest.

Geoghegan's phone call became a story, when, in fact, LeMond provided no substantive testimony regarding the validity of Landis's sample analysis.

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<sup>536</sup> AAA official arbitration transcript. p. 787, line 11.  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

# Le Petit, Gérard

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## **Machine Maintenance Service Agent**

Quad Service, Agilent Service Agent  
France

## **Summary of CAS Testimony: Immaterial**

- Outside LNDD laboratory agent to verify machine operating within specification.
- States he probably forgot to reset machine parameters to reflect reinstallation of original column.
- No direct memory of event.
- Read more about this issue on page 195.



# Martin, Laurent

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## Analytical Chemist

Laboratoire National de Dépistage du Dopage (LNDD)  
Châtenay-Malabry, France

## Conflict

Like other WADA-laboratory employees and directors, Martin is prohibited from assisting athletes in their defense.

“The Laboratory should not engage in testing or expert testimony that would call into question the integrity of the individual or the scientific validity of work performed in the anti-doping program.”<sup>537</sup>

## Summary of CAS Testimony: Not a Credible Witness

- Testified via video-conference-phone.
- Role was to testify about his memory concerning chain of custody issues more than one-and-one-half years earlier.

## Summary

Arnie’s comment:

LNDD has tested roughly 15,000 samples since Landis’s ‘A’ sample. The bottle in question was anonymous. It was number-coded. It was not a particularly special sample bottle in any way.

It is not credible that Martin could have recalled the handling of this particular sample bottle.

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<sup>537</sup> WADA International Standard for Laboratories. Annex B, 3.3. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

# Mathews, Dwight E., PhD

## IRMS Expert

Developer of the IRMS machine

Professor of Chemistry  
Chair, Department of Chemistry  
University of Vermont  
Burlington, Vermont, USA

Professor of Medicine  
University of Vermont  
Burlington, Vermont, USA

[Resume link.](#)

## Summary of CAS Declaration

Believes isotopic values in Landis were abnormal and that they indicate exogenous testosterone use.

In response to questions by Landis attorney Suh, here is Matthews's testimony at the CAS hearing about his reticence to investigate or help expose the scientific fraud going on under his nose, in his own lab:<sup>538</sup>

### Lab Colleague Scientific Fraud

CAS Hearing Transcript Page 1090  
1 DWIGHT E. MATTHEWS - CROSS  
2 Q. Dr. Matthews, you would  
3 agree that the concept of peer

4 reviewing papers is a very important  
5 one in relation to the publication of  
6 scientific papers?  
7 A. I would.  
8 Q. And certainly you would  
9 agree that an important level of peer  
10 review occurs when co-authors satisfy  
11 themselves that work done by their  
12 colleagues is scientifically credible,  
13 right?  
14 A. I would.  
15 Q. Let's go over your CV. Do  
16 you have it before you?  
17 A. Actually, if you could grab  
18 that copy that is off my chair over  
19 there. Just the top one is fine. Yes.  
20 Q. I want to direct your  
21 attention to a number of papers  
22 referenced there, numbers 107, 108,

## Not a Credible Witness for USADA

- The expert opinion he formed was based, in part, on discussions with Larry Bowers, USADA's director of science, rather than based in whole on laboratory documentation. He needed Bowers to clarify questions about how the test was performed. For the transcript and a discussion of this issue, see page 49.
- Matthews noted that the LNDD lab seems to have less regulation than he is used to in the US or other European countries. He appears to ascribe the lack of Standard Operating Procedures and regulation to: "The French are different." For a discussion, see page 83.
- A researcher with whom he shared his lab space and co-wrote scientific articles, ET Poehlman, committed scientific fraud for more than a decade.

Matthews stood by, after having been consulted by a student whistle-blower, until finally, after three trials the evidence was so overwhelming that Matthews agreed to testify against his colleague.

23 109, 114, 115, 122, 125, 129, 131 and  
24 132.  
25 MR. BARNETT: Can we let the

CAS Hearing Transcript Page 1091  
1 DWIGHT E. MATTHEWS - CROSS  
2 witness keep up.  
3 A. I have to find my pages  
4 first. Okay. Yes, 107.  
5 THE PRESIDENT: We're not  
6 asking you to remember them all at that  
7 speed. So we'll go back again.  
8 A. I assume you're referring to  
9 papers with the name E.T. Poehlman on  
10 them?  
11 Q. Correct.  
12 A. Okay.  
13 Q. Dr. Poehlman was a colleague  
14 of yours at the University of Vermont,  
15 correct?

<sup>538</sup> The AAA hearing transcript is linked at:  
<http://arniebakercycling.com/books/wiki.htm>

16 A. Correct.  
17 Q. In addition to co-authoring  
18 papers with Dr. Poehlman you actually  
19 shared lab space with him, correct?  
20 A. More the latter. He shared  
21 lab space with me, yes.  
22 Q. Dr. Poehlman is no longer on  
23 the faculty of the University of  
24 Vermont, correct?  
25 A. Correct.

CAS Hearing Transcript Page 1092

1 DWIGHT E. MATTHEWS - CROSS  
2 Q. And he is no longer on the  
3 faculty because he pled guilty to  
4 falsifying data in research over the  
5 course of almost a decade, correct?  
6 A. He resigned before that  
7 happened.  
8 Q. But he did in fact plead  
9 guilty to falsifying data in research?  
10 A. Yes.  
11 Q. Over the course of almost a  
12 decade?  
13 A. He was convicted.  
14 Q. And was convicted in federal  
15 court, right?  
16 A. In federal court.  
17 Q. Among other things, Dr.  
18 Poehlman was found to have falsified  
19 data in relation to the mean values for  
20 a total energy expenditure obtained  
21 with a doubly labeled water technique,  
22 correct?  
23 A. Correct.  
24 Q. And three of the papers that  
25 you co-authored with him involved a

CAS Hearing Transcript Page 1093

1 DWIGHT E. MATTHEWS - CROSS  
2 doubly labeled water study?  
3 A. Correct.  
4 Q. And --  
5 A. There may be more than  
6 three.  
7 Q. The paper number 107 on your  
8 CV which is entitled "Energy  
9 requirements" -- excuse me, 114 on your  
10 CV, "Energy requirements of physical  
11 activity in free-living older women and

12 men: A doubly labeled water study," you  
13 refer to as the gold standard for  
14 validating other methods to measure;  
15 isn't that right?  
16 A. The doubly labeled water  
17 method would be considered a gold  
18 standard. These papers apply that  
19 method. They didn't define it.  
20 Q. Now, the doubly labeled  
21 water method is a stable isotope  
22 approach, correct?  
23 A. Yes, it is.  
24 Q. So that part of study 114  
25 would have been within your area of

CAS Hearing Transcript Page 1094

1 DWIGHT E. MATTHEWS - CROSS  
2 expertise, right?  
3 A. It is.  
4 Q. Performing that part of the  
5 method would have been your  
6 responsibility on this team, correct?  
7 A. Correct.  
8 Q. So tell me who calculated  
9 the doubly labeled water method?  
10 A. Myself and Ray Starling.  
11 Q. And you would agree that it  
12 is important to go back and review data  
13 when doubts have been cast on its  
14 authenticity, correct?  
15 A. Correct.  
16 Q. Now another area of data  
17 falsified by Dr. Poehlman was data  
18 related to --  
19 A. First of all, are you  
20 suggesting that paper was falsified?  
21 I'm left with an odd impression.  
22 Q. Let me ask you. Was the  
23 paper falsified?  
24 A. No.  
25 Q. And did you go back and

CAS Hearing Transcript Page 1095

1 DWIGHT E. MATTHEWS - CROSS  
2 review data to resolve doubts cast upon  
3 its authenticity?  
4 A. I have. I have gone back to  
5 review our original data and then it  
6 goes next to Ray Starling. The  
7 university actually -- two things

8 happened. First of all, the person who  
9 made the complaint ended up in my  
10 office I think in November of 2000 for  
11 which we discussed the problem and I  
12 counseled him to go forward to the dean  
13 and make the allegations which led up  
14 to the final result.  
15 After the dust settled the  
16 university, the research associate --  
17 the dean of the medical school formed a  
18 panel to review these papers, defining  
19 them as either green, yellow or red.  
20 Green papers were exonerated by  
21 testimony of first or second authors.  
22 Red papers were ones that were known to  
23 be falsified. Yellow were papers that  
24 were defined as could not be told.  
25 So I'm vouching for the

CAS Hearing Transcript Page 1096

1 DWIGHT E. MATTHEWS - CROSS  
2 underlying doubly labeled water and I  
3 certainly stand by that.  
4 The first author, Ray  
5 Starling is the fellow in the  
6 laboratory who took that doubly labeled  
7 water and ultimately got it into the  
8 final tables. Ray then asserts whether  
9 or not the final table appearing in the  
10 paper is an accurate reflection of the  
11 data that was given to him from our  
12 analytical laboratory which is the  
13 general clinical research center  
14 laboratory.  
15 Q. Are you familiar with a New  
16 York Times magazine article in October  
17 2006 on the subject?  
18 A. Yes, I am.  
19 Q. And do you -- let me ask  
20 you, would you like a copy of it or are  
21 you familiar enough with it?  
22 A. I believe I'm familiar.  
23 Q. Is it true that the  
24 complainant, the whistleblower, if you  
25 will, in this case, Mr. DeNino,

CAS Hearing Transcript Page 1097

1 DWIGHT E. MATTHEWS - CROSS  
2 approached you? And I'll read from  
3 this, he approached --

4 MR. BARNETT: Excuse me, if  
5 we're going to read from it can counsel  
6 have a copy?

7 THE PRESIDENT: Yes.

8 MR. BARNETT: I'm not  
9 familiar with.

10 THE PRESIDENT: And the  
11 tribunal should have a copy too.

12 Q. Turning your attention to  
13 Page 3 of 10, and I'm reading from  
14 paragraph 4 on Page 3 of 10,  
15 "Emboldened, he approached Dwight  
16 Matthews, a faculty member who shared  
17 lab space with Poehlman. Matthews and  
18 Poehlman had written a number of papers  
19 and grants together over the years and  
20 DeNino worried that Matthews might  
21 alert Poehlman to his suspicions. But  
22 DeNino could not shake the feeling that  
23 Poehlman was hiding something, and he  
24 wanted guidance from a faculty member."  
25 Below that it's reported

CAS Hearing Transcript Page 1098

1 DWIGHT E. MATTHEWS - CROSS  
2 "First, understand that no matter how  
3 you proceed everyone loses,' Matthews  
4 told DeNino when they met to discuss  
5 Poehlman. 'Your career will be ruined  
6 because no one is going to protect you.  
7 The university will come out bad,' he  
8 continued, 'and Eric's reputation will  
9 be destroyed.' He told DeNino he would  
10 have to decide for himself what to do.  
11 As an afterthought, Matthews told me in  
12 a recent interview, he offered 'if  
13 you're going to do something, make sure  
14 you really have the evidence.' Are  
15 those statements true?

16 A. In part. So those are  
17 lifted from a telephone interview I did  
18 with is it Jeneen -- what is the  
19 author's name?

20 MR. BARNETT: At this point  
21 let's get a copy for the witness as  
22 well.

23 Q. Does Jeneen Interlandi  
24 refresh your recollection?

25 A. Right.

CAS Hearing Transcript Page 1099

1 DWIGHT E. MATTHEWS - CROSS  
2 THE PRESIDENT: Sorry, I  
3 thought you had a copy.

4 A. No, I haven't been given a  
5 copy. I've certainly seen the article.  
6 This is her paraphrasing of a  
7 conversation I had with her by phone.

8 THE PRESIDENT: We're on  
9 Page 3.

10 A. So if you have quotes I  
11 would not call those quotes as word for  
12 word by me, no.

13 Q. But the substance of it is  
14 true?

15 A. The substance that  
16 whistleblowers generally have a  
17 difficult time and that everybody comes  
18 out less than they went in I think is  
19 fair. If you contact Walter DeNino at  
20 this moment he would I think very  
21 clearly agree with you.

22 Q. Did you ever attempt to  
23 assist Mr. DeNino in his allegations  
24 that he believed that there was  
25 something terribly wrong going on at

CAS Hearing Transcript Page 1100

1 DWIGHT E. MATTHEWS - CROSS  
2 the laboratory?

3 A. We discussed his data and  
4 the possible difficulties he would have  
5 in making his case. And he went out  
6 and went looking for additional data.  
7 And when he came back with the  
8 additional data he had something that  
9 probably could not be refuted compared  
10 to his original what I would call he

11 said/she said allegations. That  
12 ultimately, that the first allegation  
13 never caused the conviction. The  
14 second allegation which was the second  
15 set of problems led to the third set.  
16 And it was the third set that caused  
17 the conviction unrelated to the  
18 original concern of Walter.

19 Q. Did you seek to assist him  
20 when he first came to you with his  
21 allegations?

22 A. Yes.

23 Q. And in what way did you seek  
24 to assist him?

25 A. In terms of counseling him

CAS Hearing Transcript Page 1101

1 DWIGHT E. MATTHEWS - CROSS  
2 as to what his options are in  
3 proceeding.

4 Q. And that was the extent of  
5 it?

6 A. Correct.

Arnie's comment:

I have at least two problems with Matthews's credibility as a witness:

1. Matthews shared office space with a colleague who committed and pled guilty to falsifying data for a decade. A colleague with whom he stills lists 10 papers on his CV.

A *student* of Matthews realized the scientific misconduct/malfeasance and came to him for guidance. Matthews made no effort to determine if there was indeed a problem. Matthews made no effort to alert his University department.

How can I have any confidence that such a paid witness would alert the panel if he felt there was a serious problem?

2. Matthews forms his conclusions on the assumption that the LNDD laboratory data is correct, and that the rules and methods he has been told by USADA are correct. As an expert, he should verify whether the rules and methods are documented (or not) by the laboratory.

# Mongongu, Cynthia

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## Analytical Chemist

Laboratoire National de Dépistage du Dopage (LNDD)  
Châtenay-Malabry, France

## Conflict

Like other WADA-laboratory employees and directors, Mongongu is prohibited from assisting athletes in their defense.

“The Laboratory should not engage in testing or expert testimony that would call into question the integrity of the individual or the scientific validity of work performed in the anti-doping program.”<sup>539</sup>

## Summary of AAA and CAS Testimony

- Specific recollection about chain of custody transfer of ‘A’ sample bottle contradicted by evidence. See page 93.
- Testifies that instrument operating parameters (including the different columns in the GC/MS and GC-C/IRMS portion of the IRMS test are different) records are correct and the values she used. This would lead to an SOP violation. See page 68.
- No SOP or validation for the method she uses to identify compounds in IRMS. See pages 88 and 180.
- Unable to explain time gaps and rewriting and deletion of files, for example mix cal acetate. See pages see pages 123 and 249. Refers to “priming the liner,” see page 403.
- Specific recollection of use of IsoPrime2 for anti-doping sample analysis contradicted by evidence. See page 89.
- Agrees matrix interference a routine problem, resulting in the inability to determine the isotopic value of the internal standard

and necessitating manual processing of the sample. See pages 197, 201, and 206.

- In order to assess the need for manual processing, she looks at the 45/44 traces. However, those traces and the start, stop, and background selection points for manual processing are not recorded in the document package. Moreover, the start, stop, and background selection points are not recorded in the electronic data files or anywhere else. For the need for 45/44 traces, see page 199. For the lack of record-keeping of values, see pages 123 and 249.
- States that she was told that instrument-operating pressures up to 6E-6 were okay, in contradiction to documentation in the operating manual for the IRMS machine. States she had no operating manual.
- Not a credible witness: Specific memory for obscure isolated events, vague on others. Appears to be led by counsel and agrees with his statements, then also agrees to his testimony correcting hers—for example: rewrote data as opposed to mixed up the bottles.

## SOP Violation

LNDD SOP M-AN-52.<sup>540</sup>

For the GC/MS portion of the IRMS analysis, the DB-17ms column should be used.

- Mongongu testified that the columns used, as documented in the operating parameters record, were different.

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<sup>539</sup> WADA International Standard for Laboratories. Annex B, 3.3. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

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<sup>540</sup> LNDD SOP M-AN-52. Analyse GC/MS –Confirmation Qualitative des Métabolites de las Testostérone et de ses Précurseurs. LNDD0664. Linked at: <http://arniebakercycling.com/books/wiki.htm>.

### ISL Violation<sup>541</sup>

ISL 5.4.4.3.1:<sup>542</sup>

“The Laboratory must establish criteria for identification of a compound *at least as strict* as those stated in any relevant Technical Document.”

- Mongongu states there is no documentation as to the method she uses in IRMS compound identification.

### ISL Violation

ISL 5.4.4.2.1:<sup>543, 544</sup>

“Matrix interferences. The method must avoid (non-threshold) or limit (threshold) interference in the detection of *Prohibited Substances* or their *Metabolites or Markers* by components of the sample matrix.

- Mongongu states matrix interference is *routinely* present in the IRMS analysis of urines, which explains the lack of accuracy in measurement of the internal standard.

### ISL Violation

ISL 5.2.6.1:<sup>545</sup>

“The Laboratory must have documented procedures to ensure that it maintains a coordinated record related to each Sample analyzed. In the case of an Adverse Analytical Finding, the record must include the data necessary to support the conclusions reported (as set forth in the Technical Document, Laboratory Documentation Packages). In general, the record should be such that in the absence of the analyst, another competent analyst could evaluate what tests had been performed and interpret the data.”

- Mongongu testified that she cannot check for matrix interference without the 45/44 traces. The traces are not included in the document package. Therefore another analyst could not evaluate the data.

### ISL Violation

ISL 5.2.4.3.2.3:<sup>546</sup>

“The ‘B’ Sample result must confirm the ‘A’ Sample identification for the Adverse Analytical Finding to be valid.”

- Mongongu agrees in testimony that it is a requirement of her job to know the ISL.
- She declared that retesting samples resulted in adverse analytical findings despite the fact that the ISL prohibits such terminology unless confirming an ‘A’ sample.<sup>547</sup>

<sup>541</sup> For more on the significance of ISL and other violations, see page 16.

<sup>542</sup> WADA International Standard for Laboratories. 5.4.4.3.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>543</sup> WADA International Standard for Laboratories. 5.4.4.2.1. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>544</sup> For more on matrix interference, see page 155.

<sup>545</sup> WADA International Standard for Laboratories. 5.2.6.1.4. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>546</sup> WADA International Standard for Laboratories. 5.2.4.3.2.3. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

<sup>547</sup> WADA Internal Standard for Laboratories, 5.2.4.3.2.3. (2004).

## Quotes From AAA Testimony

### *Chain of Custody Proven Flawed Specific Recollection About Work of Cerpolini*

Note: USADA0200 documents that Operator 18, Esther Cerpolini, performed the specific gravity and pH test on July 22, 2006 at 10:50 AM. By 11:02 AM Cerpolini was already performing chemistry operations on the sample.<sup>548</sup>

Q. (By Mr. Jacobs) You got the bottle at 11:20. You had it for five minutes?

A. “Yes.”

Q. Where was the bottle between 11:25 and 12:45?

A. “...My answer is, I did the IRMS aliquot testing. Okay? And then I gave the bottle—I placed the bottle then—

A. “(By Interpreter) I gave the bottle back to Esther.”

Q. And you did that at 11:25?

A. “As soon as I finished the aliquot.”

Q. At 11:25.

A. “Yes.”

Q. Do you have some specific recollection of this?

A. “Yes, I remember doing the aliquot sample testing, and I remember having—I remember giving her the bottle so that she could then perform the density test and the pH test.”<sup>549</sup>

A. “I do have an image [specific picture in memory] of having done that.”<sup>550</sup>

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<sup>548</sup> See documentation in a USADA0200 screenshot in Figure 46 on page 94.

<sup>549</sup> AAA official arbitration transcript. p. 539, line 14.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>550</sup> AAA official arbitration transcript. p. 543, line 23.

Q. (By Mr. Campbell) I wasn’t clear on your testimony. Did you say that you gave this file to Esther after you did the—what was it—aliquot?

A. “Yes.”

Q. And did I understand you correctly to say that when you gave it to her, she did a density test and a pH test?

A. “Yes. I gave her the bottle so that she could perform the density test and the pH test.”

Q. So she did the density test and the T/E test—pH test, and then put it in storage?

A. “Yes.”<sup>551</sup>

### *LNDD Never Investigated Leaks to the Press*

Q. (By Mr. Jacobs) Did Dr. de Ceaurriz ever ask you if you provided this information to L’Equipe?

A. “No.”

Q. Do you know if Dr. de Ceaurriz ever asked anyone at LNDD if they provided this information to L’Equipe?

A. “I don’t know. I don’t know.”<sup>552</sup>

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<sup>551</sup> AAA official arbitration transcript. p. 661, line 22.

Linked at: <http://arniebakercycling.com/books/wiki.htm>.

<sup>552</sup> AAA official arbitration transcript. p. 554, line 24.



***Retested ‘A’ Samples Negative → ‘B’ Samples Cannot Be Adverse Mongongu Fails to Understand ISL—A Job Requirement***<sup>553</sup>

Q. (By Mr. Campbell) Is it true that you’re required to understand the peak international standards for laboratories as part of your job requirement?

A. “Yes.”

Q. (By Mr. Campbell) Does this report that’s in Exhibit 88 record an analytical finding?

A. “Yes. Yes, the results were not—were abnormal.”

Q. Okay. They were adverse analytical findings?

A. “Yes.”

***Some Deleted Files and Times Gaps Explained by “Priming the Liner”***

Q. (By Mr. Suh) And you realized that when you use the same file name, that the data from the previous file is deleted, correct?

A. “Yes.”

Q. I believe yesterday you testified that the reason why you reran CalMixIRMS01, right there—

Q. —At 11:48—of the four entries timed at 11:48:08, the highlighted, of the four entries—three entries entitled 11:49:43, the highlighted one, down again to the last one at 12:17:43. Do you see that?

A. “Yes.”

Q. And your explanation was that you had to prime the liner, correct?

A. “Yes.”<sup>554</sup>

<sup>553</sup> ISL 5.2.4.3.2.7: “If the ‘B’ Sample confirmation does not provide analytical findings that confirm the ‘A’ Sample result, the Sample shall be considered negative...”

<sup>554</sup> AAA official arbitration transcript, p. 567, line 13.  
Linked at: <http://arniebakercycling.com/books/wiki.htm>.

Keith Hall comment:

***On “Priming the Liner”***

From: [Keith Hall](#) (Co-owner, MassSpec Solutions)  
To: [simon.davis@massspecsolutions.co.uk](mailto:simon.davis@massspecsolutions.co.uk)  
Sent: Wednesday, May 16, 2007 5:53 PM  
Subject: Excuses I have heard Mk. 323

Hi Simon

Neil told me of the running of standards to prime the injector/column farce. This used to be done with compounds which were very “sticky” due to their polar nature but with the advent of fused silica capillary columns this went out of the window. IF the liner was dirty and causing the problem then it should be maintained correctly and changed if signs of adsorption are in evidence, this is a standard operating procedure and masses of literature has been published on this. Easy to obtain guides are freely available from the likes of Supelco or Restek on how to maintain injector liners and columns i.e. just go to Google and type *Supelco literature* and the first or second hit will be technical literature and look at general – helpful guides, gas chromatography articles T112853 and T195895 for instance. Also have a look at Restek.com as they have myriads of information on such matters. All of it is freely available.

The only reason I can think of that they would continually inject standards is to “pick” suitable data so that it can be fitted into their needs for certain data points. The FDA takes an extremely dim view of such things, it is commonly called “data manipulation” and is a trick as old as the hills, tried many times but now fortunately outlawed by bodies such as the FDA, EPA and any other regulatory body worldwide.

**Summary**

Arnie’s comment:

Mongongu’s testimony documents the LNDD laboratory’s specific failure to establish the identity of compounds in Landis’s IRMS test.

Mongongu’s testimony documents the laboratory’s generally sloppy practices.

Mongongu’s testimony documents some of the many violations of the laboratory’s own SOPs as well as the WADA’s International Standard for Laboratories.

# Papp, Joe

## Admitted Doper and Drug Trafficker

### Summary of AAA Testimony: Not a Credible Witness<sup>555</sup>

- Papp testified that he has used performance-enhancing drugs for years, including testosterone, other anabolics, EPO, hGH, and others.
- Papp testified that he used testosterone gel for recuperation. He micro-dosed and felt significant improvement.
- He states that he was drug tested twice, and that his use was not detected.
- He testified about a culture of drug use on his 2006 “Team Whistle” Italian team. He often did not know what he took and he felt pressured to keep quiet.
- With his positive test in May, 2006, his team disowned him.
- When his wife told him she was pregnant, he states he felt an ethical responsibility to come clean.
- He testified to activities that constitute drug trafficking, including importing drugs from out of the country.
- He does not know Landis. He has no personal information concerning Landis.
- There was a delay in agreeing to his sanction until one day before the hearing. I do not understand what this means, but it smells fishy to me.

## Took Multiple Drugs, Often Unknown

AAA Hearing Transcript

Page 1018

4 Q. And when you took these  
5 performance-enhancing drugs, did you ask which  
6 performance-enhancing drugs they were?  
7 A. At various times, I asked which they  
8 were.  
9 Q. And what were you told about what  
10 they were?  
11 A. They were EPO; human growth hormone;  
12 insulin; amphetamine; corticosteroids; thyroid  
13 hormone; in some cases, anabolic steroid.

### Arnie's comment:

- I completely discount Papp's testimony.  
Papp contacted me in November of 2006. At that time, he had nothing to do with the Landis case. He had been charged with a doping violation and completely denied the charge.  
At the time, I found his unsolicited story sincere and moving. I agreed to look at his case. See his e-mail on page 405.  
I thought that perhaps he too, like Landis, might have been treated unfairly.  
I reviewed his case; it was *not* credible. His document package looked like that of a typical doping case, and the procedural issues he raised appeared to be lies.  
I relayed this information to his attorney and declined to assist him in his case.
- At the AAA hearing, Papp testified that he took multiple substances under the direction of team helpers. Did he lie to me, or did he lie to the AAA panel?
- Papp testified that he often did not know what he was taking. How, then, could he know that it was the microdoses of testosterone that were helping his recovery?

<sup>555</sup> The AAA hearing transcript is linked at: <http://arniebakercycling.com/books/wiki.htm>.

From: Joe Papp [mailto:[joe.papp@adelphia.net](mailto:joe.papp@adelphia.net)]  
Sent: Wednesday, November 29, 2006 6:45 AM  
To: [arnie@arniebakercycling.com](mailto:arnie@arniebakercycling.com)  
Subject: Anti-doping case, please review - 5mins (1000 word email)

Dr. Baker,

I am Joe Papp, a UCI-licensed road cyclist from Pennsylvania, USA, and I am asking five minutes of your time to read this email.

I have competed full-time at the elite level for 10+ years, and in addition to racing am a widely-read diarist for [cyclingnews.com](http://cyclingnews.com). This is my website: <http://joepapp.com/> and my [cyclingnews.com](http://cyclingnews.com) diaries are available through this link: <http://www.cyclingnews.com/riders/2006/diaries/papp/?id=default>.

Here is my situation:

This season (2006) I competed for an Italian team based in Tuscany. At a UCI event in Turkey in May, I was accused of having returned a positive urine sample. Cycling has been my passion since I was a young boy, and while I've pursued it full-time (in between completing my undergrad. degree and attending grad. school) it has always been an avocation more than a job. If I ran the numbers, based on opportunity cost alone it would be revealed that I've lost tens of thousands of dollars by focusing on sport instead of using my academic training and professional skills in more lucrative employment. Still, cycling was my life and gave me the opportunity to see the world, from China to Cuba, Australia to Argentina and all points in between. I met my wife, Yuliet - herself is a world-class athlete - because I happened to travel to Havana for a competition, and I've had the rare chance to share my experiences with thousands of fans through my writing.

I say this because I have no professional, moral or financial incentive to dope, and in fact the risk of a positive urine test would be to make cycling - my passion, my life - forever inaccessible to me - basically exactly what is happening now.

Yuliet and I have gone through a terrible ordeal to be together. As a Cuban sports star, she was prohibited from leaving that country, but through grit and determination managed to escape! Amazingly, she was then kidnapped in Venezuela by agents of the Castro regime while en route to join me in the USA and forcibly repatriated to Cuba. Story here: <http://joepapp.com/index.php?page=detailsnews&element=205>.

I had intended to retire after the 2006 season to better support Yuliet in her cycling (she was top-10 overall at both the Tours of Italy and Spain). We intended to ultimately live together in Italy, she racing and me working (in the cycling industry), though I first planned to secure employment with USA Cycling. However, Yuliet's aborted defection and kidnapping, and my alleged positive

drug test have thrown our lives into turmoil. I have been financially bankrupted by my battle to save Yuliet from torture and imprisonment, which - thanks in no small part to the assistance of the US gov't - we were able to prevent. She is still in Cuba, however, and the fight to secure her release has consumed what little financial resources I had.

Nonetheless, since I did not commit the doping violation of which I am accused, on moral principle alone I must continue to fight the charges. Furthermore, any hope I have of working as an administrator and coach in cycling hinges on my ability to prove my innocence. It is a very difficult time, but I have no other option but to move forward.

My request:

To that end, I am contacting you to ask that you briefly review the methodology employed by the Turkish lab in analyzing my samples, and that you briefly speak with Dr. Wally Jarman, the scientist (who is not a steroid expert) who assisted me in the initial phase of my defense, to either confirm or refute the conclusions he drew. I received pro-bono legal representation during phase one of my defense (pre-arbitration), and while I am trying to raise the funds necessary to retain paid legal counsel and an expert witness for my appeal, the concurrent fight to save my wife from a communist dictatorship limits my options.

Please understand that I am not asking for tactical information that would enable me to escape a sanction based on a technicality. Rather, I am truly innocent, I believe that there are serious discrepancies in the lab methodology, and yet my financial situation has thus far prevented me from mounting a spirited, effective defense. Regardless of the outcome of my case, I know I will never race full-time again, and I am ok with that. However, after dedicating 17 years of my life to cycling, to not be able to use my experience and knowledge to train and develop new riders, and administer the sport, is devastating.

Again, all I am asking is that you review the lab report and the conclusions drawn by Dr. Jarman (which I will send under separate cover), and then briefly speak with him to either confirm or refute his findings.

Dr. Baker, I thank you for taking the time to read this email and would greatly appreciate your contacting me at your earliest convenience to confirm your willingness to review my documents.

Sincerely yours,

Joe Papp  
HYPERLINK "mailto:[joe.papp@adelphia.net](mailto:joe.papp@adelphia.net)"[joe.papp@adelphia.net](mailto:joe.papp@adelphia.net)  
HYPERLINK "<http://www.joepapp.com/>"[www.joepapp.com](http://www.joepapp.com/)  
+1 (412) 478-3661 - phone

# Schänzer, Wilhelm, PhD

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## German Anti-Doping Laboratory Director

### Conflict

Like other WADA-laboratory employees and directors, Schänzer is prohibited from assisting athletes in their defense.

“The Laboratory should not engage in testing or expert testimony that would call into question the integrity of the individual or the scientific validity of work performed in the anti-doping program.”<sup>556</sup>

### Summary of AAA Testimony: Immaterial

Effective testimony was hindered as Schänzer spoke long distance from Europe. Displaying and reviewing chromatographs was impractical.

- All chromatographic shapes are acceptable = good.
- Q. Do you see a problem with sloping baselines?  
A. Never saw a problem with a sloping baseline.
- Q. Do you see a problem with coeluting peaks?  
A. Clear mass spectra. No interferences. Fully acceptable. No inference in IRMS. No coelution.
- Never make measurements myself.
- Should not overwrite completed files.

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<sup>556</sup> WADA International Standard for Laboratories. Annex B, 3.3. (2004). [http://www.wada-ama.org/rtecontent/document/lab\\_aug\\_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22](http://www.wada-ama.org/rtecontent/document/lab_aug_04.pdf#search=%22site%3Awww.wada-ama.org%20international%20standard%22). Accessed Dec 28, 2006.

# Shackleton, Cedric

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## Steroid Metabolism Expert

Children's Hospital  
Oakland Research Institute  
Oakland, California

[Resume link.](#)

## Summary of AAA Testimony: Not a Credible Witness

- Not an IRMS expert, but some of his colleagues are.
- Did not understand basic questions about which he is testifying: "I'm a bit out of my league."
- Contradicted his own testimony.  
Testified that metabolites must go in the same direction, and then, that no, they need not.

## Quotes From AAA Testimony

### *I'm Not an IRMS Expert, But Some of My Colleagues Are*

A. "I'm not an IRMS expert, but I—I work with people—I mean, and I have worked in the field."<sup>557</sup>

### *Testosterone Metabolites Move Together*

#### *His Published Paper is Not Meant to be Accurate*

Q. (By Mr. Jacobs) If someone takes testosterone and the pair of metabolites, as you have drawn... they both become more negative, right?

A. "Right."

Q. So they're both going up on your chart.

A. "Right."

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<sup>557</sup> AAA official arbitration transcript. p. 182, line 3.  
<http://arniebakercycling.com/books/wiki.htm>

Q. One might stop going up before the other, right?

A. "Yes."

Q. But at no point are you going to have one going up and one going down, are you?

A. "I hate to admit this, but I'm a bit out of my league following the dynamics of this type of—of thing on a kind of hourly basis."

Q. Okay. So—so your chart there is not accurate then.

A. "Oh, it was never meant to be accurate. It was meant as a description."<sup>558</sup>

## Summary

### Arnie's comment:

Shackleton was called to testify as to whether or not the values of four testosterone metabolites in the IRMS test would be expected to move together, in the same direction. That is, would it make sense that some values would rise while others would fall? Landis's position was that the values *should* move together, and therefore the testing, as performed by LNDD, didn't make sense.

His weak testimony ("I'm a bit out of my league") was refuted by Landis expert Amory.

This issue, in the "does this make sense?" department, had little to do with the hard scientific issues, such as accurate compound identification.

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<sup>558</sup> AAA official arbitration transcript. p. 177, line 10.  
<http://arniebakercycling.com/books/wiki.htm>

# **Part 3:**

# **Selected Press and Blog**

# **Coverage**

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## Selected Press and Blog Coverage

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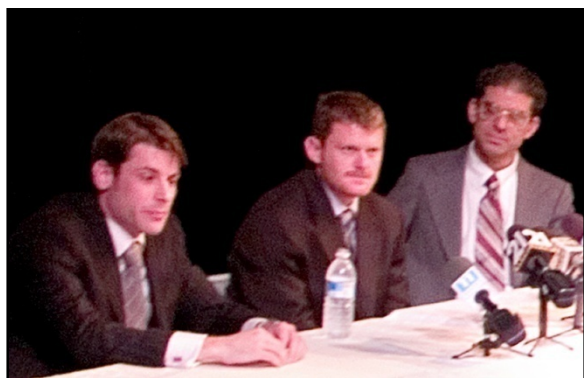


Figure 215. Michael Henson, Executive Director, Floyd Fairness Fund; Floyd Landis; and Arnie Baker. Press conference, Lancaster, PA. March 25, 2007.

Most press coverage was sport-writer based. As such, reporters commented on the human interest aspects of the story, rather than the scientific details.

Where reporters looked into the science, I *never* found support for the work of the laboratory by any independent (non-WADA-related) scientist.

A legal analysis in a cycling press report, a typical science-based blog, and multiple mainstream press and blog quotes follow.

### At Long Last, Is There No Sense Of Decency?<sup>559</sup>

By Bill Hue<sup>560</sup>

*“In the early 1950s in the US, there was what was called McCarthyism and the only reason it succeeded was that there was no resistance to it. When they tried the same thing in the 1960s it instantly collapsed because people simply laughed at it so they couldn’t do it. Even a dictatorship can’t do everything it wants. It’s got to have some degree of popular support.”*

Noam Chomsky

While I do not usually agree with Mr. Chomsky, his point is well made, here. Harvard Law School Dean Erwin Griswold noted that McCarthyism owed much of its success to the fact that government, through Senator McCarthy, was able to be “judge, jury, prosecutor, castigator, and press agent, all in one.”

Similarly, the U.S. Anti-Doping Agency (USADA), with its 12 million dollar per year budget, two thirds funded by The United States government and thus, our tax dollars, owes much of its 165-0 successful prosecution rate to the fact that it, in conjunction with its world partner, the World Anti-Doping Agency (WADA), has devised a “disciplinary system” that as a practical matter has no checks and balances, is closed and gives the anti-doping agencies license to be judge, jury, prosecutor, castigator, and press agent, all in one.

Yesterday’s government’s hunt for “communists” used the same methods that today’s government supported agency uses in its hunt for “dopers” in sport. It should then come as no surprise that the same problems exist. While the removal of communist spies from government and removing dopers from sport are both arguably noble goals, without popular support in the method used to achieve those goals, the efforts will

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<sup>559</sup> Hue, B. ProCycling News. Daily Peloton Forum. Reprinted with permission. <http://www.dailypeloton.com/displayarticle.asp?pk=10888>. Accessed Apr 20, 2007.

<sup>560</sup> William F. Hue is a Wisconsin Circuit Court Judge.

eventually fail. Just as the methods utilized though initially successful came to be ultimately rejected in the past, the very same methods ought to become similarly rejected and thus doomed to failure today. Without public support, those efforts will fail.

Critics should propose some alternatives to systems they criticize. It is important to rid sport of dopers, both to guarantee the integrity of sport and to preserve the health of its participants.

Although in its Infancy, The World Anti-Doping Disciplinary System is Not Fair and Should be Rejected

Since its creation, in 1999, the anti-doping disciplinary system has been evolving. Yet, it is not too early to conclude that the system as it currently exists is not getting better in its adolescence. It is in fact, getting worse.

#### ***A Closed System***

The system is closed in the sense the WADA Rules prevent any employee of any WADA accredited laboratory from testing or testifying in any matter calling into question the scientific validity of work performed in the anti-doping program.

While science is its most vigorous when transparent, WADA has managed to eliminate any critical oversight of its scientific processes through its secretive rules. WADA is the sole arbiter of the tests it employs and there is no oversight by the scientific community or the public. The system certainly has a vested interest in the “success” of its anti-doping scientific processes. The laboratories are not objective. They are pivotal parts of the prosecutorial process.

Until cyclist Floyd Landis took the unique step (as afforded to him by the Supplemental Rules applicable to his hearing process in North America) to demand that the disciplinary process against him be held “in public,” the adjudication process has also been closed since its inception. In fact, there is no similar provision to “open” the hearing to the public in any other region’s anti-doping arbitration process. The closed adjudicative process ostensibly exists to preserve the athlete’s medical privacy.

While Landis has been successful in bringing aspects of that process heretofore unknown to the public to the public eye, Landis and his effort to defend himself have also been roundly criticized by WADA’S Chairman Richard Pound, UCI President Pat McQuaid, USADA’S general counsel Travis Tygart and outside counsel Matthew S. Barnett (how many lawyers do US citizens need to pay for to “convict” alleged doping athletes... as many as it takes, apparently). They appear to have been the chief castigators and press agents for the anti-doping cause from the initiation of the case, ignoring the system’s nod to preservation of the athlete’s medical privacy.

Until Landis formulated his aggressive defense scheme, those were typically and primarily the only voices heard from in North American Cases. While Tyler Hamilton attempted to combat those voices publicly, he was by and large and especially in comparison to Landis, unsuccessful.

Once the arbitration panel assigned to the Landis case got a handle on it and thus got a handle on Landis, a “gag” order as to evidence was achieved, bringing any “new” aspect of the case (such as the result of the additional ‘B’ samples being tested at LNDD) back into darkness until the hearing.

The interesting thing about the “gag” order is that it borrows from a North American civil and criminal judicial concept designed to avoid influencing jurors by “trying” one’s case in public, something not at all applicable to the arbitrators themselves, who are not likely to be influenced by anything Floyd Landis, Travis Tygart or supporters or critics of either side say or reveal in public. Rather, the “gag” order simply appears to reject Landis’ broad concept of “openness” in the process.

#### ***Checks and Balances***

The disciplinary system utilizes a private arbitration company under rules created by WADA and a nomination process favoring the anti-doping agencies qualifies the arbiters. The system lacks checks and balances. We don’t need a civics lesson to know that there are legislative (they make the laws), executive (they enforce the laws) and judicial (they adjudicate the laws) branches of government in North American democracies.



In Anti-Doping Agencies, the agency makes the anti-doping code, prosecutes the anti-doping code and restricts the arbitration panel through the anti-doping code to abide by its overriding goal, to rid sport of “dopers.” As a result, the prosecutors are able to achieve “convictions” because of a convoluted “burden turn” system, utilizing to any reasonable degree any method (such as in the Landis case, one month before hearing, testing additional ‘B’ samples, the twins of previously tested ‘A’ samples found to be negative, to support or replace “defective or challenged” ‘B’ samples that were supposed to “confirm” their twin, non-negative ‘A’ sample) necessary to prosecute an alleged “doper.”

### ***Success or Injustice?***

Moreover, when the results of the system’s “successes” become public, if they do, the stories told are horrific. WADA’s “Strict Liability” policy, particularly, is severely unfair.

For example, A 17-year-old Italian swimmer treated her foot infection with an over the counter cream her mother bought her and failed a urine test for steroids. The Panel acknowledged that the steroid in the cream did not enhance or favor her performance. She was banned from competition for a year because no penalty in the WADA Code addressed that kind of violation. She was treated the same as if she intentionally took a steroid to enhance performance.

Similarly, a British skier failed a urine test because the Vick’s inhaler he used for chronic nasal congestion had a different compound in the US than Vick’s inhalers purchased in Britain. The US inhaler contained a banned substance, although its formulation lacked an actual stimulant. The athlete forfeited his Olympic bronze medal. He, too, was treated the same as an athlete intentionally cheating and obtaining an actual advantage in competition.

An athlete was banned from competition for being late for an out of competition urine test, due to unforeseen heavy traffic. No penalty existed in the code to address an appropriate penalty for that violation. The athlete

was punished the same as would an athlete intentionally missing the test would have been. Other similar anecdotal cases abound. Such cases indicate that the system is too often arbitrary and draconian. Those adjectives are the antithesis of dignity and fairness in a judicial process.

### ***The System is not Fair***

- The science it employs is not transparent or accountable.
- Its science is not objective and is, in fact, part of the prosecution process.
- While the adjudicative process acknowledges the athlete’s privacy, its leaders engage in public relations acts contrary to an athlete’s privacy.
- The system lacks checks and balances.
- Its results are often draconian and arbitrary, anecdotally.
- Anti-doping agencies act as judge, jury, prosecutor, castigator and press agent, all in one.

This kind of system has correctly been rejected by the public in the past and should not derive support from the public today.

### ***The System Can be Fixed***

While the system as currently enforced is not fair, there are steps that can be taken that will go a long way toward making the system fair to the athletes while continuing to vigorously pursuing elimination of illegal doping in sport. Implementation of the following procedures and protocols would do much to level the playing field and provide a fair and balanced enforcement system.

### ***Enforce the Existing Rules***

First; enforce the rules that already exist prohibiting comment on the guilt or innocence of an athlete until such time as the matter concludes. Enforce the rules that already exist prohibiting violation of the medical privacy of an athlete. No comments should be permitted by anyone associated with an anti-doping agency or its partners about “worse case scenarios” or other hints designed to identify athletes.

Any such comment should be censured or punished even if made by leaders of the anti-doping agencies or their partners. If a WADA lab leaks such information and the anti-doping agency or one of its partners want to beat the Lab to the leaks, discipline the leaking lab and its media accomplices. Restrict media violators from access to events, interviews and other niceties frequently conferred on media representatives if they supersede basic human rights rules. Shut down the lab or find the person there providing the leaks. Punish them for violating the rules that already exist and enforce those rules instead of ignoring them. Encourage a new culture of respect and dignity, whether an athlete is guilty or not.

### ***Transparency of the Scientific Process***

Second, open up the scientific process. Utilize outside laboratories to develop and also evaluate anti-doping tests. Subject WADA accredited labs to vigorous scientific evaluation from outside entities, particularly in North America, where taxpayers support the system and the laboratories with their tax dollars. Opening up WADA coffers to others will encourage ingenuity and incentive for “outside scientists” to help the ADA’s keep up with doping athletes, who always seem to be ahead of the curve and who make it profitable for “outside” scientists to help them cheat.

Turn this around and make it as profitable for “outside” scientists to join the battle against doping as it is for them to develop ways to cheat the tests. Permit WADA accredited laboratory employees to testify as to the truth, whatever the truth may be and for whoever is seeking that truth. In conjunction with true transparency and accountability, provide the athlete with all test results. Finally, test non-negative ‘A’ sample twin ‘B’ samples or other samples allowed at another WADA accredited laboratory.

### ***Future Testing***

Third, because WADA may be behind in recognizing methods of cheating, make the athlete’s aware that their urine/blood samples, once submitted, shall be subject to further testing for cheating methods such as EPO injection, for which no tests were available at the time of submission

for some reasonable period of time. This probably would require “A”, “B”, “C” and “D” sample parceling. If an athlete doesn’t have enough urine, take urine and blood or hold the athlete until enough of a biological sample is obtained.

### ***Arbitration Rules***

Fourth, release arbitration panels from any Supplemental Rules or Code requirements that either needlessly flip burdens or authorize the Panels to engage in prosecutorial procedures that do whatever is possible to convict an athlete. Change any such rule to permit the Panel to utilize whatever procedures are necessary to be fair.

### ***Strict Liability Policy***

Fifth, examine and change the draconian results of the “Strict Liability” policy. Adopt rules permitting the arbiter’s to assess the violating act against a broad enough array of penalties so that justice may occur.

### ***Professional Riders Union***

Sixth, particularly as applicable to professional cycling, the athletes should form a strong union to protect their interests individually and collectively so that the power of the anti-doping agencies can have some sort of a check and balance. (Editor’s note: The UCI currently considers itself the Riders Union and each contract contains a clause that any professional rider active in forming a union can have his license revoked. This is a conflict of interest and illustrates the further need for appropriate checks and balances. The licensing entity must not be permitted to prohibit independent representation counter balancing its power.)

### ***Union and Change of the Doping Culture***

Seventh, also as particularly applicable to professional cycling, one of the stated goals of the union should be to condemn cheating in all forms and doping in particular. Change the culture of cheating through leadership and peer pressure. Destroy the Omerta.

### ***Team Anti-Doping Initiatives***

Eighth, also particularly applicable to professional cycling, the teams and management must become more involved in the anti-doping process and also held accountable for doping by members of their team. Part of the budget committed by each team should be a minimum sum for increased independent security and a T-Mobile/Slipstream type medical program to establish medical baselines.

This must include increased additional testing for all athletes as analyzed by independent laboratories paid by the teams but selected and accredited by WADA, outside of and independent of mandatory WADA medical controls.

Teams and management should be subject to monetary fines for violations of the team's obligations and also violations by individual athletes. Other methods might also be employed to enforce the anti-doping rules. One such consequence for violation might require a team to compete with one or two less team members in a race/competition or a series of races/competitions. Deduction of UCI team competition points should also be a consequence.

### ***Conclusion***

The current anti-doping system isn't working. In professional cycling, sponsors have left the sport in disgust or disgrace. Fans of cycling have become cynical or disinterested. The cyclists themselves are divided and seem disillusioned. The Omerta still rules. The clean cyclists lose to cheaters and winners are rewarded with higher pay. The media sensationalizes cycling's problems to sell papers or product, secure in the knowledge that even if its treatment of the sport destroys it, there is always a new day and new way to sell a story tomorrow.

Those who love cycling should no longer support a system that not only has miserably failed to remedy the problem of doping in sport, but has also caused the additional problems highlighted herein.

If you love the sport of cycling, as we do you want to help fix and preserve it.

If you have a passion for the sport and sports at all, you want clean sport with a transparent, fair and effective system of discipline; that is supported by all involved. This is why we published this editorial and others. We appreciate your questions or comments.

*"Bill Hue is an avid cyclist and cycling fan in his spare time. He is Wisconsin State Circuit Court (Trial) Judge (Branch 2, Jefferson County), professionally. The views expressed are strictly his own."*

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Typical Science Blog

**EnvironmentalChemistry.com**

May 22, 2007

Editor's Blog

[When science, peer review & independent experts are anything but](#)

"What I see is a seriously screwed up system that abuses science and railroads athletes. These cases aren't about a search for the truth, but a desire to get a conviction at all costs and to catch all cheats even if this means also ruining the lives of a few innocent athletes along the way."<sup>561</sup>

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<sup>561</sup> [Barbalace, Kenneth](http://blog.environmentalchemistry.com/2007/05/when-science-peer-review-independent.html). EnvironmentalChemistry.com. <http://blog.environmentalchemistry.com/2007/05/when-science-peer-review-independent.html>. Accessed May 23, 2007,

<http://blog.environmentalchemistry.com/2007/05/when-science-peer-review-independent.html>

*“IF I were an aliquot, and you were my Labby...  
Would you set me down anywhere,  
Would you treat me shabby...?”*

(NB: this post is the web-equivalent of  
a 14p. document: you are warned!)

*\*This writing imagines that one could present  
to the CAS arbitration Panel hearing the Floyd  
Landis appeal, an ‘amicus’ brief (a ‘friend of  
the court’ document), offering arguments or  
persuasive reasoning that could help the Panel  
to reach a just conclusion. These are sometimes  
pertinent, where the interests of a case, and the  
potential Decision expected, would have  
repercussions extending beyond the  
immediacies of the parties.*

*This writing does not rise to the level that it  
could, in terms of citations to law, or otherwise,  
were it to be properly submitted to the CAS  
arbitrators. WADAWatch reminds the casual  
reader that drafting to a Court, or Court of  
Arbitration for Sport, is laborious, hopefully  
thorough, hopefully persuasive and hopefully  
correct. In most cases, weeks or months would  
be taken to create such a document:  
WADAWatch spent some eighteen hours on this  
draft.<sup>562</sup>*

<sup>562</sup> <http://wadawatch.blogspot.com/2008/03/wada-world-revised-amicus-brief.html>.  
Accessed March 29, 2008.

*It does qualify - when submitted to the Court of  
Public Opinion...*

+++++

...to the Distinguished CAS Arbitration Panel hearing the Floyd Landis appeal in New York City, which began its five-day schedule on Wednesday, the 19 March, 2008, and ended on Monday, the 24 March.

### **Introduction**

1. This amicus brief is presented to the Court of Arbitration for Sport (CAS) Arbitration Panel by WADAWatch, on behalf of those unnamed individuals whose lives will be most affected by the Decision produced in the appeal of *Landis v USADA*: future Athletes found guilty by WADA accredited laboratory evidence of a doping rule violation. This appeal to CAS follows the Decision against Mr Landis, a licensed professional cyclist, which was taken by the AAA Arbitration Panel, having been properly appointed under jurisdictions shared or attributed by the UCI, with or toward the agency USA Cycling and the USADA, who variously shared rules and responsibilities. The AAA Panel published its Majority Decision and Minority Dissent on 20 September 2007. Mr Landis did file his CAS appeal within the proper time delay.

2. WADAWatch is a globally accessible, English language Internet ‘weblog’, or ‘blog’.[FN1] The ideals of WADAWatch match those included in WADA’s Fundamental Rationale (infra, at para. 53). Its distinct market is in rendering WADA operations more transparent to the non-legally focused world, providing pleas to its institutional conscience, and raising consciousness to the full legal import of language presented in the WADA Code. The Code is the World Anti-Doping Agency (WADA) “Level 1” document; WADA also has ‘Level 2’ documents which include its two *International Standards* (for *Testing* and laboratory analysis. IST and ISL, respectively) as well as other subsidiary documents that, in combination create the international sport anti-doping regulatory system. International

Foundations implement anti-doping rules that conform with the WADA Code. The Union Cycliste International (UCI) is one of the IFs that has established its anti-doping rules in conformity with the Code. WADAwatch hopes that its commentaries serve to aid WADA and its constituent stakeholders, such as the UCI, in their common quest: to attain higher levels of regulatory competence, thereby facilitating respectable levels of scientific and legal consistency by its Signatories, such that Decisions taken in similar cases are equitable and just.

3. WADAwatch (sometimes noted herein as “Ww”) offers as a reference the inclusion of comments it had published in October 2007 on the WADAwatch blog, in the officially-published “*Legal Opinion on the Conformity of Article 10.6 of the 2007 Draft World Anti-Doping Code with the Fundamental Rights of Athletes*”.[FN2] Published by WADA in November 2007 on the eve of its World Conference, the Ww comment concerned the omission by WADA of a Definition of “Aggravating Circumstances”, which omission was ‘supported’ by the authors of that Legal Opinion. This mention, in a report available on the WADA website, affords some small indication of the sincere systemic assistance provided through this six-month old blog, established in September of 2007. Ww also attended the Third WADA World Conference on Doping in Sport (Madrid, November 2007)[FN3], as well as its Third Press Symposium, held in February 2008, in Lausanne.[FN4]

4. In offering this amicus brief, Ww addresses four problems that Floyd Landis has been facing, since his victory in the 2006 Tour de France was overturned by the Majority Decision of the AAA Panel, based on evidence produced by the French national laboratory for sport doping cases. Every problem discussed has its origin in WADA’s Level One and Level Two documents: the CODE, and the ISL. Two of those four problems stem from the case as developed against Landis by the legally responsible organizations who contributed the evidence, or processed of the case; one problem evolves out of the institutional attitude of the WADA towards

Athletes’ litigations; the last topic only originated in the week prior to this Landis appellate hearing. Those topics are:

- I. What level of confidence can be associated to the evidence that the *Laboratoire Nationale du Dépistage du Dopage* (LNDD) offered (being a French governmental laboratory, now renamed the ‘*département des analyses*’, and hierarchically placed within the *Agence française de lutte contre le dopage* (AFLD))?
- II. Is Landis inculpated only due to an unequal application and enforcement of the WADA *Code* between classes of stakeholders?
- III. Is WADA’s expressed reliance on ‘Judicial Interpretation’, as a means to amplify unexpressed, or hypothetical meanings of its Code, actually a “*Quigley* violation”, and detrimental to proper WADA rules promulgation?
- IV. Given the aspects of Argument III, supra, is participation by WADA in financing a majority of the USADA appellate costs in this case a legitimate use of its funding under the controlling 2003 WADA *Code*, or does it establish a very discriminatory precedent toward future Athletes, whose defense of their cases, solely due to WADA’s inordinate reliance on ‘judicial interpretation’ as opposed to proper Code drafting, may be more contentious and thus more expensive than otherwise would be the case under a properly drafted WADA *Code*?

### *I Evidence from the LNDD*

5. The 84-page Majority Decision of the AAA arbitration Panel who decided the Landis case, in September of 2007, included these two sentences, regarding the quality of certain evidence:

“The Panel does, however note that the forensic corrections of the Lab reflect sloppy practice on its part. If such practises continue *it may well be that in the future an error like this could result in the dismissal of an AAF finding by the Lab.*”[FN5] (emphasis added)

6. In the less verbose (26 pp.) Minority Dissent, Attorney Christopher Campbell wrote the following ascerbic opening to his Dissent:

“From the beginning, the *Laboratoire National de Dépistage et du Dopage* (“LNDD”) has not been trustworthy. In this case, at every stage of testing it failed to comply with the procedures and methods for testing required by the International Standards for Laboratories, Version 4.0, August 2004 (“ISL”) under the World Anti-Doping Code, 2003 (“WADA Code”). It also failed to abide by its legal and ethical obligations under the WADA Code.”[FN6]

7. It becomes difficult to fathom how the Majority of the Panel could accept ‘sloppy’ forensic corrections in the Landis case, as well as apparently dismissing the other evidence of substandard lab performances, and hand down a two-year suspension against the Athlete, at the same time it conditioned this action by stating that if “such practises continue it may well be that in the future an error like this could result in the dismissal of an AAF finding by the Lab.” This CAS Panel must satisfy this question: ‘why did Landis lose, if a future litigant would likely prevail, if and when the same lab creates the same errors again?’ There are very few exceptions to a rule for Athlete’s ingestion of Prohibited Substances, or Procedures, yet the AAA Majority, in this specific case, has appeared to create a ‘do-over’ rule for lab failures that is not found in either the WADA *Code* or *ISL*.

8. How did LNDD earn such low marks from both sides of a three-member panel, and still have its evidence triumph in this case? Should future Arbitration Panels have an arbitrary discretion to ‘hand-slap’ an offending laboratory, and menace it with future sanctions if “such practices continue”, while effectively handing down a decision that destroys the involved Athlete’s career as a bread-, and Tour-winning father and husband? Is there no vehicle provided through the Code through which a substandard submission of doping control evidence holds that laboratory liable?

9. The deliberation by CAS arbitrators as to those same facts that produced the AAA Majority’s assertions, above, as well as the questions found in the immediately preceding paragraph, must be intimately related by logical reasoning, to the second legal contention offered herein: WADA has instituted a biased system of enforcement.

## ***II Unequal application and enforcement of WADA Code amongst stakeholders***

10. WADA appears to have deliberately produced an enforcement system, being the *WADA Code*, and its related subsidiary *International Standards*, that has been designed to protect its Signatories unduly, and inflict unnecessary legal costs on victimized *Athletes*.

11. Any urine Sample, taken from a licensed professional Athlete, or cyclist in this case, should be treated as forensic evidence in light of the enormous penalties under which these Athletes are now penalized if proven at fault.[FN7] WADA has sought to ensure that quality forensic work products are standard to the laboratories it has accredited. To ensure this, WADA wrote Code Article 6.4 “Standards for *Sample* Analysis and Reporting”:

Laboratories shall analyze *Doping Control Samples* and report results in conformity with the *International Standard* for laboratory analysis.

12. While making quality analyses mandatory according to its *International Standards*, it has *de facto* imposed an implied standard of strict liability on its family of accredited laboratories. There exists, however, no mention in the Code for any penalties to accrue to a laboratory that fails these forensic duties. This appears to be a deliberate omission by the drafting committee of the World Anti-Doping Agency, for which no explanation is available (to the public). Ww stresses that this ‘appears’ to be the case, because, in the Code, WADA provided a clause regarding appeals by laboratories that have been suspended, or had their accreditation revoked (infra, at para. 19, et seq.).

13. Prior to discussing the Appeal process available to suspended Laboratories, there is an additional Code Article to bring to this CAS Panel’s notice. Article 7: Results Management, also has mandatory language prescribing the process for administering ‘potential anti-doping rule violations, in the ‘pre-hearing’ phase.

14. Briefly, Article 7.1 “Initial Review...” contains the following extract:

“Upon receipt of an *A Sample Adverse Analytical Finding*, the *Anti-Doping Organization* responsible for results management shall conduct a review to determine whether: (a) [Ww: on TUEs]..., or (b) there is any apparent departure from the *International Standards* for *Testing* or laboratory analysis that undermines the validity of the *Adverse Analytical Finding*.”

15. Article 7.2 “Notification After Initial Review” mandates the next logical step:

“If the initial review under Article 7.1 does not reveal an applicable therapeutic use exemption or departure that undermines the validity of the *Adverse Analytical Finding*, the *Anti-Doping Organization* shall promptly notify the *Athlete*, in the manner set out in its rules, of... .”

16. Thus any Athlete, whose status as such is of sufficient sporting ability to merit attention by WADA and its Signatories, receives an express assurance by WADA and its Signatories that his or her *Samples* must be analysed in conformity with the *Code* and *International Standards*, as found in Article 6.4. He or she, as *Athlete* facing a potential *AAF*, also has the express assurance of *WADA* and its *Signatories* that the *ADO* with results management responsibility will first ensure that the evidence it receives, in light of the indications of positivity provided by the accredited Laboratory, presents no evidentiary indications that the laboratory “departed” from these norms (Article 7.1 and 7.2). Recall the rather low threshold for these departures: “... that undermines the validity of the *AAF*.” (NB: WADAwatch respectfully reminds the CAS arbitrators that Article 7.2 has been ‘tightened’ up for the redrafted Code: departures must be proven “... to have caused the *AAF*.” WADAwatch would ask “By whom?”, reminding that at the stage we are discussing, the laboratory’s results *are in the hands of the ADO*.

17. WADAwatch would point the CAS Panel’s attention, once again, to Code Article 7. *ADOs* ‘shall’ seek to confirm that the evidence is of forensic quality. They are instructed to do so, confirming that there are no ‘departures’. However, reasonable reflection would bear witness that WADA deliberately chose not to include any potential “Article 7.3”, which might have laid down a mandatory procedure for *ADOs* to follow, *if they*

*did find a significant ‘departure’ from Code and/or International Standards, by the Laboratory that produced the inculpatory evidence.* And whether it could do that in one sub-Article or two, there is also no required provision within this Code Article that the ADO with results management authority *shall inform the Athlete* of its finding of a ‘departure’, and *shall confront the Laboratory* on behalf of an Athlete, when ‘departures’ are noted in the submitted evidence package from a WADA accredited laboratory. WADA would have the CAS Panel note, that there are neither a Definition of ‘Departure’, nor any list of examples, as to what levels of ‘departure’ should cause a laboratory suspension or revocation. More importantly, CAS must ask itself and WADA how ADOs are equipped to distinguish evidence that the *‘departure undermined the validity of the AAF’* (Changes to ‘caused’ next year). The status quo should not be allowed, that an Athlete may be inculpated exclusively through inclusion of substandard evidence, such as we have from the Landis Majority Decision.

18. A system, such as the anti-doping regime established by WADA, must resonate fairness to all participants for it to retain the State support of its Signatory Governments. CAS must consider why equilibrium was not provided within the construction of the *Code*, with strict liability standards against *Athletes’* ingestion of doping product(s), and no commensurate provisions against labs. This CAS Panel must consider whether or not these legal mandates are distributed fairly upon its Signatories, their accredited laboratories and the ADOs. Put another way: has WADA constituted a ‘balanced’ quasi-legal system affording rights to all parties in equal measure? This brief contends that that ideal world has not been provided, to date, by the work of the many people or institutions whose combined efforts have produced the WADA *Code*. There are serious oversights, or omissions, whose responsibility lies on WADA, in apparently failing to create Articles that clearly designate what ADOs are to do with evidence suggesting substandard laboratory performance. The one overarching fact of the Landis case is, that it is the ideal vehicle to ‘Audit’ the entire legal regime that WADA has laboriously constructed.

19. As noted in paragraph 12, *supra*, the *Code* contains Article 13.5: “Appeals from Decisions Suspending or Revoking Laboratory Accreditation”. Therein, WADA catapults across the void it carefully established through apparent, *designed* inattention or neglect, being the failure to address actual suspensions or revocations of any Laboratory’s WADA status in the *Code*, and declares:

“Decisions by WADA to suspend or revoke a laboratory’s WADA accreditation may be appealed only by that laboratory with the appeal being exclusively to CAS.”

20. WADAwatch submits that this represents an aberrant, unjustifiable leap of legal norm-setting. WADA leapfrogs from its mandating of proper science work practices on Laboratories (Art. 6.4), and ensuring that no laboratory departures from that standard occurred, by the ADO with results management responsibility (Art. 7.1 and 7.2), to ignoring the consequences on that Laboratory if proven to have produced substandard work product(s). It alludes to “Decisions by WADA to suspend or revoke a laboratory’s...”, with no reference to Articles, ISL Articles, or any other body of rules. However WADA has provided here, within the *Code*, for ‘Appeals’ by Laboratories that were suspended, or revoked, presumably for substandard scientific and forensic competences? WADA has claimed that the *IST* and *ISL* allow for these types of Laboratory-related investigations and/or disciplinary actions.[FN8]

20.a The WADA ISL Article 6.4.8.2 lays out the ‘Suspension of Accreditation’ structure, with a list of examples: the only pertinent example is “*failure to take appropriate corrective action after an unsatisfactory performance*”. Read a second time, that phrase harbours great import to the position WADA has taken. This abnormal position is obvious: WADA does not suspend laboratories that perform unsatisfactorily: it is only expressing that it could suspend a laboratory subsequent to its failure to take any corrective action. CAS should be very aware of the lack of balance this



causes. The equivalent level of punishment, if levelled against Athletes, would mean that Athletes would only be suspended *IF they were told, after a positive AAF ‘STOP taking dope or we will suspend you!’ and then failed to do so*. As we are unclear from WADA’s failure to include any Definition, whether ‘*unsatisfactory*’ is worse than ‘*sloppy*’ but better than ‘*untrustworthy*’, CAS may have to ‘interpret judicially’ what WADA means by this inarticulate Article. WADAwatch would suggest that CAS consider according more weight to the Attorney’s characterizations of this laboratory in his Dissent, as he was not inclined to offer a substandard work-producing laboratory a second chance, as did the Majority Decision. CAS could also consider why it was not the USADA, that processed this as a ‘departure’ complaint.

20.b There are no links from this thin, isolated *ISL* Article, to stating who at WADA decides, in which forum, that a laboratory had performed to an *unsatisfactory* level, and who initiates the process. How might any ADO initiate an “*ISL 6.4.8.2*” action, without an expressed regulatory basis in the WADA Code at Articles 6.4, of 7.1 and/or 7.2, or prior to Article 13.5. As far as is possible to discern, WADA appears capable of acting to suspend any laboratory whenever it ‘feels’ justified. WADAwatch would assert that, if WADA anticipates that its sport-doping regime is to survive as structured today, there should be express reference within the *Code* (Logic would dictate this be placed after Article 7.2) toward the precise Article(s) in the *ISL* and *IST*, if necessary, which control disciplinary proceedings between WADA, the ADOs and accredited laboratories. ADOs who may have to alert WADA to a need to investigate and, if necessary, procede into a disciplinary action against one of its labs, after receiving a laboratory’s evidence documents, now have no expressed legal course of action in the *Code*.

21. CAS will render its Decision, *de novo*, on the facts of the Landis case, while aware that the *WADA* accredited Laboratory, according to all three Arbitrators on the AAA Arbitration Panel, did not maintain portions of its work product in conformity with the *WADA Code*, nor with its *International*

*Standards*. There is no reference to any submissions forwarded by the USADA to WADA or to Mr Landis, notifying these interested parties of *consequential departures*, nor is any request made by the USADA to WADA, to sanction the LNDD for its “sloppy” or “untrustworthy” work product(s), which in combination create the equivalent of a violation of mandatory quality standards mandated in Article 6.4. Yet the transcripts from the AAA arbitration prove that Mr Landis incurred great expense to show that these forensic *manquements* apparently were a simple result of the LNDD’s consistent and considerable failures to take its responsibilities seriously. Inaction against the laboratory’s documentation package may be a serious error of procedure by the USADA. If so, USADA’s failure to act as described herein certainly also implicates WADA’s failure to draft compliance enforcement Articles towards the Laboratories it deems ‘accredited’.

22. Whether or not CAS is reassured that it may never have need to hear a *WADA* accredited Laboratory appeal its suspension (Article 13.5), due to the omission of criteria in the *Code* that would generate such a case (which WADAwatch has stridently suggested should happen, proposing herein the inclusion of a *Code* Article 7.3 and/or 7.4, if necessary, to ‘complete the chain’ from exposed departures), the ambiguities presented have imposed undue, severe financial burdens on the Athlete, Landis. He evidently had to litigate his case based on these insupportable findings of ‘sloppy’ work or ‘departures’, with USADA, rather than receiving USADA assistance against the evidence package provided by LNDD.

23. CAS should consider the enforcement of a finding that the ADO with results managing responsibility (here the USADA) failed its duty on behalf of Floyd Landis, to pass to WADA a report of ‘laboratory departures’ in which the grounds include this accredited Laboratory’s failure to perform sufficiently (furthered through the evidentiary problems analysed in the Decision and Dissent), under the imposed *Code* and *International Standards*. If the USADA failed a duty to protect this Athlete from an unnecessary litigation (Articles 7.1 and 7.2), that failure is only by

implication, since WADA itself has failed to provide the necessary regulatory tools. A CAS Decision that the USADA failed to so perform would have justifiably strong impact on WADA; the failure by USADA would be subordinate to WADA's, and in proportion with the failure accorded WADA's omission to promulgate controlling language within its *Code*. Such a decision would reinforce, legally, that which WADA has not performed: adequate drafting of its quasi-legal enforcement system, to enact similar levels of strict liability on each class of stakeholder: the Athletes, and the Laboratories whose evidence (Article 6.4, ISL) inculpates those Athletes. CAS can also establish with this Landis appeal Decision, its view on the trend of these perceived imbalances, between laboratories and ADOs, etc. versus the Athletes, *result expressly from a deliberate path of omission by WADA*, served *per se* as the single source of the exorbitant legal costs attributed to this case. Constraints against Athletic conduct must be balanced by equal liability and enforcement, and the mechanisms to do so, toward the accredited Laboratories on whom WADA relies. WADA, its ADOs and impugned Athletes could all share swifter justice with fewer appeals, at lower cost, under a clear and balanced WADA Code.

### ***III 'Judicial Interpretation' as a "Quigley violation" of WADA rules promulgation***

24. Many situations in life can be found, in which members of a group may decide to see '... how far they can go', or '... what they can get away with'. One example is seen in many families: children rebel against their parents by using TV-watching as an excuse to stay awake longer: 'please? Just to the end of this show?': thus begging parents to accord one extra half-hour tonight, forty-five minutes tomorrow.

25. Politicians can perform similar acts, often with consequences more grave. WADAwatch submits that, during its original drafting process and the recent redrafting exercises that have produced the WADA *Codes* (first the 2003 version, and as redrafted (through 2007), taking effect before 2009), WADA institutionalized an attitude that it had to act tough against

tough actors, and that it could do so by creating tough rules. Whether the WADA *Code* represents 'Tough Love', it also has, in retrospect, revealed a disdain approaching arrogance for fairness and equality between its various Signatories and the Athletes whose lives are affected by accusations and convictions for doping.

26. The legal standard CAS instituted, on rules and their legal basis, has been in existence for some thirteen years now: it precedes the birth of WADA. In the CAS case of *USA v. Quigley*, CAS reasoned the following:

"The fight against doping is arduous and it may require strict rules. But the rule-makers and rule-apppliers must begin by being strict themselves. Regulations that may affect the careers of dedicated athletes must be predictable. They must emanate from duly authorised bodies. They must be adopted in constitutionally proper ways. They should not be the product of an obscure process of accretion. Athletes and officials should not be confronted with a thicket of mutually qualifying or even contradictory rules that can be understood only on the basis of the de facto practice over the course of many years by a small group of insiders.'

[Ww: emphasis added]

(CAS: USA Shooting & Quigley v. UIT, 1995 (CAS 94/129))

27. WADAwatch submits that the above stated reasoning remains the 'gold standard' for the normative formation and implementation of a regulatory system for administering globally uniform sports-doping discipline and justice. If ever CAS varied from this level of objectivity, hopefully that would be to impose a higher and stronger basis for administrative rule-making. Landis may present the case that serves justice by demanding the

updating of *Quigley*, which argued between the lines for creation of a *fair* regulatory system.

28. However, evidence is growing that WADA itself prefers the opposite: an anarchic, piecemeal system which is receding farther, through each redrafting of the *Code*, from the *Quigley* rule. WADA consistently has stated or supported the contention that CAS, or the European Court of Human Rights, if necessary, can provide the additional adjudicatory input that amplifies, clarifies or renders less ambiguous, the deliberate commission or omission of Code Articles by WADA, offering incomplete or improper legal criteria.

29. The sequence described in Section II, *supra*, of the burdens, departures and appeals attributed variously to relevant Laboratories, ADOs and Athletes through Articles 6.4, 7.1 or 7.2, is one such example: WADA does not allow, by clear rules, for the bringing of a complaint of substandard lab work, as may be found in the evidence package of a positive control for any Athlete, by the ADO with results management authority. While another example pertains only to the revised Code, and its wholly-new Article 10.6 on “Aggravating Circumstances”, the “Legal Opinion” mentioned (*supra*, at para. 3, and endnote 2) states a viewpoint by its authors, both of whom qualify (with all due respect) as members of ‘the small group of insiders’, against whose *interpretations qua accretions* the *Quigley* decision warned. WADAwatch contends simply it is a legitimate presumption that WADA is in full agreement with these authors, or else WADA would not have offered it on their website in support of their redrafted *Code*. The view stated by these authors, both eminent legal, sport doping and arbitration experts, includes the following:

“78. Indeed, according to the European Court of Human Rights, it is not necessary that the requirement of foreseeability derive in toto from the rule itself. *It can also be met through judicial interpretation*.[FN92]

which often relies on official comments made by the drafters of the rules (*travaux préparatoires*).

[FN 92: ECHR Müller and others v. Switzerland, No. 10737/84, Judgment of 24 May 1988, at 29, where the Court that found that the Swiss Federal Tribunal’s consistent case law could supplement the very broadly formulated provision of criminal law.]” [Ww: *italics* added]

30. In opening this Section of our amicus brief, an allusion pointed to a serious contention: of omissions or commissions that result in incomplete legal drafting, and present a presumed WADA ‘viewpoint’ of ‘*can we get away with this*’? If WADA were seriously disposed to create a harmonized and standardized process for ‘convicting’ Athletes of their doping offenses, it should have reasonably anticipated the case might appear in which any of WADA’s Laboratories, staffed with a combined total of hundreds or thousands of employees around the globe, may inadvertently, negligently or deliberately produce Doping Control results leading to the prosecution of an *AAF*, which may not rise to the level of forensic consistency and control mandated by Article 6.4. Make no mistake regarding the effect on any Athlete’s career from negligence or malfeasance by a laboratory or its staff.

31. If the failure to draft the Code properly was merely an oversight, and if CAS decides that what was presented by LNDD was not forensically reliable evidence, CAS should nullify the USADA–AAA arbitration Decision and reinstate Landis’ Tour de France victory. It should not agree to offer ‘judicial interpretation’ on an Article–by–Article basis, where the Organization whose rules do not conform with *Quigley*, is anticipating such an outcome, and thereby avoids its just duty of proper rules promulgation. If deliberately designed with the lacunae already cited herein, the WADA *Code* and its progeny have created a prejudicial system to which CAS, as a respected member of the International Olympic Movement for many years, should not be offering its support. A Decision that sustains USADA, as was given in the AAA Decision, would be a serious blow against *Quigley*.

32. CAS should not allow a precedent to be established, which appears to create a derivative, illegal '*legal-drafting TAX*', on Athletes facing suspension hearings. If WADA and its Code drafting committees are not able to foresee and prepare for cases under a fair system, and if it hopes to 'win points' through litigations in front of panels presided over by a 'small group of insiders', in contravening the pure institutional essence of *Quigley*, then the burden of paying this *tax* falls on, or is shared, only by litigating Athletes whose cases involve acerbically-opposed interpretations to these over-dimensioned *Code* lacunae. Recent news articles have pointed out the cost of some two million dollars achieved, by Landis' efforts to clear his name and reputation. Certain of these media articles contain 'complaints' by WADA or USADA officials, lamenting their necessity of spending exorbitant sums to 'prosecute guilty athletes'. [FN9] WADAwatch submits that it is not within the portfolio of CAS' many competences, to act as a redrafting agent for the extensive problems that are associated with the WADA *Code*, through a single Decision as complex as will be produced for this Landis case. Further, States are paying dearly, and the IOC is matching those contributions with handsome sums to WADA, in anticipation that WADA performs its drafting duties to the highest possible capability, when the reality comes across differently: today, it is Floyd Landis, and his attorney's, as well as the citations provided by the previous AAA arbitration Decision and Dissent, that bear witness to the high costs of appealing arbitration decisions which may have been taken as a result of the poor drafting of the *Code*. Mr Landis' legal costs are directly attributable to the poor drafting of the *Code*, its progeny, and the combined lacunae which this amicus brief has highlighted.

33. WADAwatch contends that such complaints to the press by WADA and USADA exhibit *disingenuous media manipulation by both organizations*, where WADA's lack of precision drafting, under the guidance by members of WADA's drafting or redrafting committees, has *by itself* created the unfair, biased system under which only an Athlete with 'deep pockets' can actually hope to clear their name and reputation. WADA could have drafted

a *Code*, and complementary *International Standards*, whose clarity, fairness and precision reduced the need for 'judicial interpretation' to a last, *de minimus* resort. It did not succeed in that exercise, and it remains questionable whether it in fact intended to do so. It should do this forthwith, rather than waiting for another World Conference some years ahead in the future.

34. USADA could have avoided these extraordinary costs, of which it has publicly complained in the press [FN10], by using the same evidence it received from LNDD in a sanctions hearing *against LNDD (under hypothetical bases, since the procedures needed remain imaginary, not being components of the Code, specifically Article 7, nor from the ISL)*, instead of presenting it, as valid evidence against Landis to the AAA Panel of arbitrators. In that fashion it would have been LNDD who paid the piper, instead of Landis, in a potential USADA-WADA disciplinary hearing against LNDD. If some such process had occurred, a Panel that described portions of that evidence as 'sloppy practice ... [which] could result in the dismissal of an AAF finding by the Lab', or, simply "untrustworthy", may have suffered the LNDD to bear being the first WADA accredited laboratory to be suspended or face revocation.

35. Ww suggests that this CAS Panel has the ability to render an extraordinary Decision, and should do so, requiring WADA to reflect upon its unstated yet implemented policy of forcing litigating Athletes to shoulder very heavy financial and legal burdens. Guilty Athletes, or innocent ones, nevertheless are sharing a simple goal: finding justice in a balanced, harmonized and standardized system of sport-doping adjudication for the *AAF* or rule violations *of their case*, with unassailable fairness to *all Signatories* and *Athletes*. They should not bear the financial burden of carrying water for WADA, via repeated 'judicial interpretations' of deliberate or arbitrary drafting failures in its *Code*. If WADA had to subsidize any side of a doping Arbitration, it should be forced to subsidize an Athlete's legal expenses the *instant* it argues for 'judicial interpretation' of any substantive lacunae omitted from the Code. CAS must remind

WADA of the vast degree of difference between ‘judicial interpretation’ and ‘failure to perform diligent *Code* drafting duties’.

#### ***IV WADA’s participation in financing a majority of the USADA appellate costs***

36. WADAwatch suggests that the Court of Arbitration for Sport is much better equipped, legally fully competent, and certainly more familiar with *WADA*, its *Code* and *International Standards*, than are the *Athletes*, and a good percentage of attorneys who work for *Signatories* of WADA. Costs of defending one’s status as a internationally recognized Athlete, whether guilty or innocent of an *AAF*, when ‘sloppy’ or ‘untrustworthy’ laboratory evidence may be the cause, are going to be high for any Athlete, and any *ADO*, whether that is the world’s best financed, such as USADA, or one from a less resource-rich country. Whether their prowess merits financial compensation through salary, winnings or product endorsements, or they enjoy a sport with little or no commercial value, Athletes facing an *AAF* or rules violation, innocent or guilty alike, must pay their own legal fees, or submit to receiving the suspension for a violation that may not be able to be proven satisfactorily. The procedures to discipline and suspend Athletes are more often funded by the *ADO* with authority, or National Olympic Committee, or any sport-oriented Federation. Under the WADA Code 2003, there is no Article or sub-Article mandating that the funds that come to WADA through its budgetary process of contributions from the International Olympic Committee, Governments and other Signatories, may be used for ‘boosting’ the budget of those Signatories whose own financial structures may be inadequately funded for litigation of sport-doping cases.

37. Stories in the press, early in the week leading up to the opening of the CAS hearing for Mr Landis in New York, brought to light that WADA had contributed the lion’s share of funding for the USADA appeal costs. CAS must rule that this financial intervention is untoward, unfounded in the WADA Code, and rises near to the level of unseemliness that broaches the territory of ‘conflict of interest’.

38. It has been the consistent position of this amicus brief, that CAS should deliberate and decide that the *evidence* presented by LNDD does not rise in reliability to the standard to which WADA should reasonably be holding its Signatories’ accredited laboratories, that *unequal enforcement* has been, inadvertently or deliberately, introduced into the *Code* and *International Standards*, that WADA’s admitted reliance on ‘judicial interpretation’ places undue burdens on Athletes, and constitutes a illicitly-imposed ‘legal-drafting tax’ on the Athletes who must not only fight the *AAF* results, but the imbalanced legal process that WADA has imposed.

39. It is a wholly-separate issue of greater import and with grave, lasting repercussions, that WADA has provided funding to the *ADO* prosecuting the Landis case appeal. Article 20.7 of the 2003 Code lists the “Roles and Responsibilities of WADA”. Therein it is established that WADA shall act:

- 20.7.1 To adopt and implement policies and procedures which conform to the Code.
- 20.7.2 To monitor the processing of Adverse Analytical Findings.
- 20.7.3 To approve International Standards applicable to the implementation of the Code.
- 20.7.4 To accredit laboratories to conduct Sample analysis or to approve others to conduct Sample analysis.
- 20.7.5 To develop and approve Models of Best Practice.
- 20.7.6 To promote, conduct, commission, fund and coordinate anti-doping research.
- 20.7.7 To conduct an effective Independent Observer Program.
- 20.7.8 To conduct Doping Controls as authorized by other Anti-Doping Organizations.

40. It remains clear from *Code* Article 13.2.3, that WADA holds a right to appeal, broadly across the system it has instituted. In neither of these Articles, is WADA accorded the selective arbitrary function of financing other, non-WADA appeals in which it is not appearing as a party in good faith.

41. There is no mandated, nor justifiable policy that allows WADA to add its financial resources in such a blatantly unjust method, less than a week prior to the opening of a hearing process. WADA announced with some remorse, at its World Conference in Madrid, the operational problems it was facing from: a) unpaid Signatory annual contributions, b) increasing numbers of adjudication-related expenses *through increased appeals in which WADA had appeared or initiated*, and c) the falling US dollar, as contributions came from around the world in various currencies, were converted to Canadian dollars (the denominated operational currency) and that obligations of the Organization were often paid out in dollars, thus producing a major shortfall (given the dollar's recent collapsing trend).[FN11]

42. WADAwatch points out to the CAS Panel, that the sub-Article 20.7.8 cited supra, has been expanded into the redrafted Code. It now reads as:

20.7.8 To cooperate with relevant national and international organizations and agencies and other Anti-Doping Organizations, including but not limited to, facilitating inquiries and investigations.

43. Ww wishes to remind the CAS Panel of our high level of discomfort, at what appears to be irresponsible WADA endorsement, or new criteria, being 'judicial interpretation by design'. Yet, once again, in the near future when this revised Code sub-Article comes into force, a future litigating Athlete will perhaps be forced to argue against the extension, in favour of an *ADO* having enforcement authority, that the '... not limited to...' portion

of this sub-Article 20.7.8 should not be extended to financing ADO appeals.

44. There are three foreseeable problems with the current case being funded by WADA, as well as the revision shown above, to Article 20.7.8.

45. Firstly, WADA appears to be establishing a bad precedent of commencing operations as a 'Central Bank' for extraordinary cases. That it is doing so for the largest anti-doping organization, the USADA, appears to indicate a need to win this case 'at all costs', and detracts from having funds available to perform its duties across the board of its other educational, research and assistance activities. WADAwatch requests that the CAS Panel consider the image given to WADA's member States, and other Signatories, of whom some valid requests for such assistance and support to progress in their implementation tasks, probably received little or no such support by WADA, for lack of available funds. It may not be under the remit of this CAS Panel, to resolve a question such as whether WADA, given its current financial state and its inability to fund some member States' or other Signatories' requests for funding assistance, is legally supported by acting as it has against one particular Cyclist, in one specific appeal. If allowed, the extraordinary precedent established in this case, via WADA's generous funding of its richest Signatory ADO's most expensive case to date, opens a *Pandora's Box* of inestimable problems.

46. Secondly, the situation could potentially give rise to a conflict of interest, precisely across the sum of substantive positions in this WADAwatch amicus brief. It is no secret that the attorney who contributed greatly to the initial process to create the WADA Code, and chaired the committee that redrafted the Code in the years 2006–2007, which exercise culminated with acceptance in Madrid last November, is also the lead attorney that was hired by USADA to prosecute Floyd Landis. He stood before your Panel this week. CAS is in the position of watching this one attorney use the portions of the Code that exist, and benefiting from potential Code sub-Articles that do not exist, under his own expert designs,

to prosecute this Athlete. Given the AAA arbitration Decision and Dissent, Landis clearly may not have been blamed by the LNDD tests, if a hypothetical ‘Article 7.3’ (allowing ‘departure’ cases between ADOs and the labs which inculcate Athletes through AAFs) was part of the Code as herein suggested. Mr Landis is paying mighty sums to clear his name: from accusations founded on ‘sloppy’ or ‘untrustworthy’ evidence, *or complete that attorney’s WADA Code work product*, through expensive arbitration, providing WADA with extensive ‘judicial interpretation’.

47. If the Code is incomplete; if the Code as written, is legally biased against Athletes and imbalanced, in favor of not disciplining a Laboratory whose work shows substandard performances, or ‘departures’, if the precedent hearing was able to conclude that there existed a sufficiency of evidence to penalize Mr Landis *simply because the Code contains loopholes that allow egregious Laboratory errors to be ignored*, these may be attributable to the one individual who has worn two hats in this case. WADA may be funding this appeal illegitimately, to protect the entire body of work that it has deliberately produced, under this attorney’s guidance.

48. Reverting back to the revision of 20.7.8 (supra), the wording of this redrafted sub–Article certainly could provide for inclusion of similar wording: “... not limited to, facilitating inquiries, investigations *and disciplinary procedures*.” (emphasis added) WADA did not do so: was this a deliberate omission? Will CAS request that WADA rectify this sub–Article? Is Floyd Landis being taxed, through participation in an appeal to clear his name, for CAS to provide proper drafting suggestions for WADA, that the attorney and his various drafting committee colleagues have failed to provide, in spite of their long, accumulated years of expertise, in the exercise of their mandate? Ambiguity in law, rarely favors the pocketbook of the client who pays for the Court to ‘*tranche*’.

49. The sum total of evidence originated with one exceptional positive test against Landis, by the LNDD, and the procedures of litigation surrounding that evidence, has created the perfect lens, an eye into this case with which

to examine “*what is the WADA Code and system?*” In attempting to create judicial balance between the Athletes, on the one hand, and the entire investigatory and disciplinary mechanisms on the other, WADA has glaringly misstepped and poorly fared: the financial burden on Landis remains enormous. As we see through the Landis case–lens, Articles appear to have been designed simply to dissuade present and future Athletes from succumbing to, or reverting to the world of insidious doping practices. In redrafting its sub–Article 20.7.8, the omission of these three words “... *and disciplinary procedures*” (supra, para. 48, in italics) will project, in all likelihood, yet another future ‘judicial interpretation’ defining WADA’s *Code*. However, and more importantly, the sum evidence of poor *Code* redrafting by WADA of Article 20.7.8, denies member Signatories, those States and International Federations, as well as the IOC, an open debate as to whether this was a proper role, for an Organization whose limited financial resources would become increasingly strained by such selective case–support.

50. Moreover, the third strike against this action is the worst: the fact that WADA finances an appeal running against Athlete ‘A’, and does not do so against Athletes ‘B’, ‘C’ or ‘Z’, is the most blatant exhibition of institutional discrimination that such an Organization could portray. WADAwatch cries, in a loud voice charged with *reason*, and *rationality*, that injustice is being forced into any Decision that favors WADA’s position throughout this case.

51. WADA is funded by Governmental contributions, other contributions from IFs, and matching funds from the International Olympic Committee. The United States is, one presumes reasonably, one of the larger national sources of funding contributions (which are not broken out in WADA’s Annual Reports). CAS could consider, without ruling (as this case is not about the USA’s contributions), whether the effect of WADA’s contributed sum to aid the USADA prosecution of the Landis appeal, has a *de facto* effect of offering the USA a rebate on its past contributions. How are other States going to regard this ‘reversed contribution’?

52. CAS is implored not to allow WADA to subsidize the Landis appellate prosecution. Whether CAS agrees with WADA and USADA, or Landis, his attorneys and WADAwatch (on behalf of future case victims, as well as Landis), as to the case-specific details regarding use of exogenous testosterone by Mr Landis, its Decision must include repayment by USADA for the funds it has received in transfer from WADA, and it must forbid that WADA discriminate against selected Athletes in a similar arbitrary fashion in the future.

### **Conclusion**

53. WADAwatch has not addressed the actual scientific evidence itself. WADAwatch merely focuses, and presents for review by Court of Arbitration for Sport, that this Landis case actually presents many vital arguments that devolve simply into a *profound assessment of what WADA is, what WADA does, and how WADA implements both, through documents and its Signatories*. The Code begins, in part, with a Fundamental Rationale. Components of those high ideals include: “Ethics, fair play and honesty”, [...] “Character and education”, [...] “Respect for rules and laws.” It is the most sincere contention from WADAwatch, that there are better methods for implementing these ideals institutionally, than WADA has displayed, as viewed through the magnifying lens that is the Floyd Landis case.

54. Proper rules promulgation is the essence of that which CAS sought via its decision in the case “*USA v. Quigley*”, in the decade prior to the creation of WADA. Not in any rational world, should an exceedingly biased document be able to offer rules that are strictly imposed on only one component of the realm it regulates. If the reasoning in *Quigley* is to be endorsed, CAS must see the sum total of the imbalances imposed by WADA against Athletes as unjustifiable, unjust and in need of immediate redress. This is not to lighten the controls taken against Athletes, this is to bring other Signatories, such as laboratories, or ADOs, to the same, strict scientific perfection that is the basis for an imposed ‘Zero Tolerance’ anti-

doping system. Violation of the ISL, ‘in another case’, could have the ADO telling WADA that it must refuse an indicated AAF due to laboratory rules violations: the Athlete would be shielded from a false accusation, the laboratory would defend its actions to WADA and the ADO, a decision would be taken, and only at that point, would the world know if an Athlete was under suspicion of doping, or if a laboratory was being suspended. No other system creates the ‘better world’ WADA appears to want publicly. In the alternative, the CAS panel must inquire whether WADA is confident its accredited laboratories can perform to such high degrees of perfection. To answer that question in the negative is to invite the implosion of the world according to WADA.

55. If evidentiary Standards (Art. 6.4 and ISL) on laboratories are to be strictly enforced against Laboratories, CAS cannot find in favor of USADA and WADA against Landis.

56. If the level of strict liability that is imposed on Athletes, and rightly so, is also to be imposed rigorously on laboratories whose work produces the only evidence on which *AAF* cases hinge, then CAS cannot find in favor of USADA and WADA.

57. If there is a case against Mr Landis, only due to the fact *that an ADO like USADA cannot bring a case* (a hypothetical “Article 7.3 case” as herein suggested, supra, at paras. 17 and 22) *against the laboratory who provided a substandard evidence package*, characterized in part by the AAA arbitrators as ‘sloppy’, or otherwise as ‘untrustworthy’ due to the laboratory’s failure to work faithfully to International Standards, CAS must decide in favor of Landis, if only to the degree that the evidence does not rise to a ‘convicting’ quality.

58. If the implicit policy of WADA remains status quo, forcing Athletes to fund its extensive necessary ‘judicial interpretations’ through a *legal-drafting* tax, which become absolutely necessary to mend the lacunae, or bridge the gaps evident throughout the original *Code*, and its redrafted



replacement, contradicting the proper *Quigley*-derived system that was designed to put Athletes (or other “Persons”) on notice as to the legal effects of regulatory operations under the Code, then CAS cannot endorse those deliberate actions with a Decision supporting USADA and WADA.

59. And whether this CAS Panel is persuaded by the arguments presented herein, WADAwatch is crying out in favour of justice: there appears to be a) absolutely no legal justification, b) overwhelming evidence of discrimination, and c) aspects that give rise to an appearance suggesting a potential conflict of interest, all of which are posited by WADA’s funding of this appeal prosecution. CAS must force WADA to reverse the decision to fund USADA in this appeal.

60. WADAwatch expresses its sincere appreciation to the Court of Arbitration for Sport for allowing the submission of this amicus brief document.

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## Hall of Fame

June 18, 2007

### [As the Wheel Turns: Beyond Planet Floyd](#)

By Scott Tinley

“[S]hame on USADA and WADA for making it personal, for its discomposure and abashment in smearing the accused.”<sup>563</sup>

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## Lancaster New Era

May 31, 2007

### [Vigil continues as Landis supporters await ruling in doping case](#)

By Bernard Harris

“[Magisterial district judge} Garrett said he found the hearing educational. ‘The rules of the hearing before the three-member arbitration panel were much different than those in his small-claims courtroom,’ he said.

‘I would have died to have this in front of a jury,’ Garrett said. ‘I am totally convinced that a jury of his peers would not convict after hearing that.’”<sup>564</sup>

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## Los Angeles Times

May 31, 2007

### [Landis case succeeds in exposing faults](#)

By Michael A. Hiltzik

“You’ve got a code of ethics that essentially states [the labs] can’t point out mistakes,” said Christopher L. Campbell, the arbitrator who had been selected for the panel by Landis.

“I think it’s a real problem.”<sup>565</sup>

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<sup>563</sup> <http://www.hofmag.com/content/view/847/30/>.

<sup>564</sup> <http://local.lancasteronline.com/4/205004>.

<sup>565</sup> <http://www.latimes.com/sports/printedition/la-sp-landisfinal31may31.1.3039158.story?coll=la-headlines-pe-sports>.

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## Anchorage Daily News

May 27, 2007

### [Anti-doping show trial is bicyclists’ circus](#)

By Craig Medred

“Just think, if USADA had stuck to science—as it said it would when the case began—Lemond wouldn’t have been asked to appear in the first place. Nor would Joe Papp.

But let’s be real for a moment. This really isn’t about science.

This is about a bunch of chemists convinced they’ve caught a bad guy and, by God, they’re going to hang him one way or another.”<sup>566</sup>

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## The Washington Post

April 27, 2007

### [The Lab That Couldn’t Compute Straight](#)

By Sally Jenkins

“The WADA and the USADA are as ethically flawed as the dopers they pursue. It’s time to rework the anti-doping code into a more just and merciful one, one that takes into account the possibility of a mistake, and which allows for repentance. Why should athletes be held to an iron, inflexible standard, while doping agencies and accredited labs are permitted mistakes, indiscretions, and lapses?”<sup>567</sup>

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<sup>566</sup> <http://www.adn.com/outdoors/story/8924151p-8824270c.html>.

<sup>567</sup> <http://www.washingtonpost.com/wp-dyn/content/article/2007/04/24/AR2007042402594.html>.

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## The Independent

March 19, 2007

### [Cycling: After Tour triumph Landis takes on even tougher test](#)

By Alasdair Fotheringham

“Landis: ‘Fighting doping is one of the most important fights going on in sports right now. Doping is cheating. But it’s also too easy to look at the sport from the outside and say that everyone is cheating. That’s a cop out. My concern for professional cycling is that the current approach to testing and enforcement isn’t fair to athletes and, in their rush to catch accused dopers, the governing bodies and anti-doping organisations don’t play by the rules.’”<sup>568</sup>

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## ESPN.com

March 9, 2007

### [Is Landis’ public self-defense really paying off?](#)

By Bonnie DeSimone

“No other athlete accused of taking performance-enhancing drugs has mounted a public defense campaign of this scope, with these tactics. Landis decided early on to ask that the arbitration hearing by which he will be declared guilty or cleared be open to the public, a right never before exercised by any U.S. athlete.”<sup>569</sup>

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<sup>568</sup> <http://sport.independent.co.uk/general/article2323450.ece>.

<sup>569</sup> [http://floydfairnessfund.org/resources/03\\_09\\_07\\_ESPN.pdf](http://floydfairnessfund.org/resources/03_09_07_ESPN.pdf).

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## ESPN.com

February 9, 2007

### [Landis doesn’t expect to race this season](#)

By Bonnie DeSimone

“USADA should not have pursued the case because the evidence the agency received from the testing laboratory in France was deeply flawed. (Jacobs filed a motion to dismiss with USADA’s Anti-Doping Review Board, which denied it.) Landis and his associates contend the lab data is riddled with clerical and scientific errors and have posted documents on the Internet to solicit feedback and build public support for his stance.”<sup>570</sup>

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## Los Angeles Times

January 16, 2007

### [Cracks in the doping code](#)

International officials want major revisions of antidrug rules.

By Michael A. Hiltzik

“The current system, in the words of the Association of Summer Olympic International Federations, is ‘far too oversimplified’ and can lead to ‘absurd’ results.”<sup>571</sup>

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<sup>570</sup> <http://sports.espn.go.com/oly/cycling/news/story?id=2748021>.

<sup>571</sup> [http://www.floydfairnessfund.org/resources/1-16-07\\_LATimes\\_0.pdf](http://www.floydfairnessfund.org/resources/1-16-07_LATimes_0.pdf).

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**Reuters**

January 8, 2007

[Landis slams WADA's Pound. Says remarks are "absurd"](#)

“Dick Pound’s recent defamatory and absurd public comments—in the midst of a process where the highest ethical standards should support a fair and just outcome—highlight the dramatic and systematic problems with global anti-doping enforcement and adjudication,” Landis said. ‘Mr. Pound should conduct himself in a manner consistent with the seriousness of the unsubstantiated allegations against me and the damage they have caused to a great number of people.’”<sup>572</sup>

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<sup>572</sup> <http://www.floydfairnessfund.org/resources/01-08-07-Reuters.pdf>

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**New York Times Magazine**

January 7, 2007

[The Scold](#)

By Michael Sokolove

“Pound took something like a schoolboy’s delight in talking about Floyd’s lab result, which supposedly showed his testosterone level to be grotesquely above what is typical for most men. Landis has denied taking a prohibited substance and is fighting what could be a two-year ban from cycling. ‘I mean, it was 11 to 1!’ Pound said, referring to Floyd’s reported testosterone-to-epitestosterone ratio, a measure used to identify doping. ‘You’d think he’d be violating every virgin within 100 miles. How does he even get on his bicycle?’”

“Take the ruckus he [Pound] caused when he charged that one-third of players in the National Hockey League, or about seven per team, were using illegal performance enhancers. Sitting in his office, I asked him how he came up with that estimate. He leaned back in his chair and chuckled, completely unabashed to admit that he had just invented it. ‘It was pick a number,’ he said. ‘So it’s 20 percent. Twenty-five percent. Call me a liar.’”<sup>573</sup>

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<sup>573</sup> <http://www.nytimes.com/2007/01/07/magazine/07Antidoping.t.html?ex=1325826000&en=519f8fd43e9274c7&ei=5088&partner=rssnyt&emc=rss>

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## Los Angeles Times

December 23, 2006

### [Landis putting lab to the test](#)

The Tour de France winner's team of experts uses the Internet to spark debate about doping charges. 'I have nothing to hide,' he says.

By Michael A. Hiltzik

"Landis' airing of the evidence against him and his demand that his arbitration hearing be open to the public is a challenge to USADA and the World Anti-Doping Agency (WADA), which are known for their resistance to outside scrutiny. A link to the documents is available at [www.floydlandis.com](http://www.floydlandis.com).

'I have nothing to hide, and I'd be happy if people could get to see how the system works,' Landis, 31, of Murrieta, said in a recent interview. 'Since the system is rigged against me and the odds of winning are small, whether you're guilty or innocent, at least I could demonstrate to the world that I was innocent.'"<sup>574</sup>

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## New York Daily News

December 17, 2006

### [After the fall, Landis battles to clear his name](#)

By Wayne Coffey

"Pound, 'He has to find some way to overcome the fact that there is an 'A' and 'B' sample that is up to its eyeballs in testosterone.'"<sup>575</sup>

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<sup>574</sup> [http://floydfairnessfund.org/resources/12-23-06\\_LATimes.pdf](http://floydfairnessfund.org/resources/12-23-06_LATimes.pdf).

<sup>575</sup> [http://floydfairnessfund.org/resources/12-17-06\\_NYDailyNews.pdf](http://floydfairnessfund.org/resources/12-17-06_NYDailyNews.pdf).

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## Los Angeles Times

December 11, 2006

### [Athletes see doping case appeals as futile exercise](#)

The arbitration system is flawed, with a tilt toward accusers. Accidental and trivial cases result in harsh penalties.

By Michael A. Hiltzik

"Athletes are presumed guilty and denied routine access to lab data potentially relevant to their defense.

- Trivial and accidental violations draw penalties similar to those for intentional use of illicit performance-enhancing substances.
- Anti-doping authorities or sports federations have leaked details of cases against athletes or made public assertions of their guilt before tests were confirmed or appeals resolved.
- Arbitrators, theoretically neutral judges, are bound by rules drafted and enforced by the World Anti-Doping Agency and its affiliates, including the U.S. Anti-Doping Agency. They have almost no discretion to adjust penalties to fit individual circumstances."<sup>576</sup>

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<sup>576</sup> <http://www.latimes.com/news/local/la-me-doping11dec11.0.2817972.story?coll=la-headlines-california>.

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## Los Angeles Times

December 10, 2006

### [Athletes' unbeatable foe](#)

Anti-doping authorities serve as prosecutor, judge and jury. The innocent often pay a high price.

By Michael A. Hiltzik

“What has evolved to protect competitive purity since then is a closed, quasi-judicial system without American-style checks and balances. Anti-doping authorities act as prosecutors, judge and jury, enforcing rules that they have written, punishing violations based on sometimes questionable scientific tests that they develop and certify themselves, while barring virtually all outside appeals or challenges.”<sup>577</sup>

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## The Mail on Sunday

December 10, 2006

### [The world's biggest drug cheat or victim of the greatest injustice sport has known?](#)

“Landis, predictably, denies his guilt, although he understands why the global public remains skeptical. ‘I don’t fault people for believing I must be guilty,’ he said. ‘If I were looking in from the outside, I’d be feeling exactly the same way. But I’d like to be given a fair trial and the evidence to be considered with an open mind.’”<sup>578</sup>

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<sup>577</sup> <http://www.latimes.com/news/nationworld/nation/la-sp-doping10dec10.0.1444445.story>.

<sup>578</sup> [http://floydfairnessfund.org/resources/12-10-06\\_TheMailonSunday.pdf](http://floydfairnessfund.org/resources/12-10-06_TheMailonSunday.pdf).

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## Agence France Presse

October 28, 2006

### [McQuaid frustrated by Puerto investigation](#)

“World cycling chief Pat McQuaid has launched a broadside at the handling of a doping investigation which has left the UCI virtually unable to sanction riders *suspected* of cheating.”<sup>579</sup>  
[Emphasis added.]

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<sup>579</sup> <http://www.velonews.com/news/fea/11105.0.html>.

## Post AAA Ruling Press Coverage

The majority and dissenting opinions of the panel members are linked at: <http://arniebakercycling.com/books/wiki.htm>.

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## Quickrelease.com

April 29, 2008

[After 1 million views, TbV winds down](#)

By Carleton Reid

“Whatever the rights and wrongs of cyclists who may or may not have doped, the Floyd Landis case opened a lot of people’s eyes - mine included - to the lynch-mob mentality and sometimes shoddy scientific method of the tax-funded anti-doping organisations.”

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## Trust But Verify

January 10, 2008

By [Rubber Side Down](#)<sup>580</sup>

Set Floyd Free, said TBV,  
“But how can we”, said LNDD,  
“You see his pee is high in T”,  
Many peaks in IRMS, you see”

But dug, we did, into this mess,  
and found too many errors, about this test,  
“Ve lost ze data”, they did jest,  
An end to valid science tests.

Floyd’s heroic ride is gone,  
ASO didn’t even throw him a bone,  
But Greg is still on the phone,  
Explaining how the dope is done.

And so, we look for justice now,  
A hope and prayer, someday, somehow,  
The world will soon declare, and  
how!,  
Of Floyd’s true and great win, we bow.

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<sup>580</sup> <http://trustbut.blogspot.com/2008/01/1000.html#c2806655027740028888>

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## Trust But Verify

April 04, 2008

### [Members of the Court](#)

**Pound, Briner and Werner will remain members of the court**

By Bill Hue<sup>581</sup>

“In the last sentence from a [Cyclingnews.com article](#), we read, Pound, Briner and Werner will remain members of the court.

This apparently confirms what a number of journalists suspected but could not write with absolute certainty because confirmation was always withheld ..... Dick Pound IS a member of the CAS Court and has been for some time, including the time during which he was Chair of WADA.

Richard Young is also a member of that court (confirmed at his web site). CAS is hopelessly compromised.”

That is sad but after all, there are only a few individuals who know the true joy of sport, its unique aspects and the application of sporting “fact” to skewed “principals” of legal due process as they choose to define it (because it is so unique and not understandable to non-sportsmen).

Their world is quite small. We have to accept their draftsmanship of rules, with their prosecution of cases they feel constitute a violation of rules they created and their judging of their own draftsmanship, decision to prosecute and application of “law” they created to cases they deem a violation of those “laws”.

Now we understand that they also and finally review their decisions as appellate judges of their own draftsmanship, prosecution, and application of their law to cases they prosecute as violations of that law.

It is small wonder that Richard Young is so adamant about the “guilt” of athletes he prosecutes to the point where he virtually testifies himself. He wrote the law. He knows the standards he wrote. He knows HIS laws and standards were violated.

As judge, he would know much more about the subject matter than pesky things like presentation of evidence and cross examination and credibility of witnesses and impartial evaluation of science.

How in the world can this system be accepted by ANYONE as fair and impartial???? The facts that an athlete “wins” on occasion cannot negate the appearance of and actual conflict of interest inherent in this bizarre adjudicative system.<sup>582</sup>

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<sup>581</sup> William F. Hue is a Wisconsin Circuit Court Judge.

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<sup>582</sup> <http://trustbut.blogspot.com/2008/04/members-of-court.html>.



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## Trust But Verify

January 28, 2008

By Bill Hue<sup>583</sup>

“If the bizarre burden flips, the presumption of guilt, the absurd requirement that the athlete prove a negative and the convenient interpretation that ISL’s are to be interpreted in favor of adverse findings and that any unwritten ISL allows labs to literally do whatever they want are removed from the provisions and interpretations of the WADA Code, it is fair enough to proceed to prosecute non-positive analytical cases the way they would be pursued in European and North American civil courts.

The problem is combining the worst characteristics of a biased and corrupt system (and for those who chose to worship at the altar of the anti-doping religion, this does not mean I either condone or support doping in sport..... I support fair and just systems that provide dignity and due process to all participants) with theories of guilt in which no scientific basis exists for any presumption of guilt.

This combines traditional anti-doping science techniques which arguably support an initial presumption of guilt with others that do not and guilt is presumed nonetheless. Try proving you are not a doper when a sworn statement says you are and the presumption is guilt. You can’t. Then, combine that with the permitted use of a single scientific testing “positive” when ISL and the WADA Code require two (for obvious reasons) to support the sworn affidavits etc. and you have a catastrophic injustice, in my opinion.

But that is how Bock and Tygart and Pound and McQuade (sic) want it. God forbid anyone be forced to “fight the power” when all vestiges of fairness and scientific reasons are abandoned in the pursuit of dopers.

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<sup>583</sup> William F. Hue is a Wisconsin Circuit Court Judge.

You get more protection under employment law in many states as a guy watching and downloading pornography on company time using company computers and internet access supplied to facilitate business compared to that afforded to a professional cyclist accused of doping. That simply isn’t fair nor right.”

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## Trust But Verify

October 15, 2007

[Seven Paragraphs](#)

Panel and WADA “Experts” Bend Truth to Convict Landis

By TBV

“The [decisive part](#) of the Landis arbitration was the reliability of the IRMS tests. In the critical seven paragraphs of the award, the majority contradicted itself and presented outright lies as their justification for conviction. In saying the arguments of the Landis experts were ‘unsound and without any reasonable scientific basis’, they have shown the dishonesty and duplicity that the WADA/CAS community will go to protect their own interests to convict an athlete.”

“These seven paragraphs of the award do not present reasoned conclusions based on science or law, and are the heart of the ruling against Landis. Without them, there is no case.”<sup>584</sup>

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<sup>584</sup> <http://trustbut.blogspot.com/2007/10/seven-paragraphs.html>.

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## Trust But Verify

October 2, 2007

### [Serving the Master](#)

**Fair is not fair, but that which pleaseth**

By Bill Hue<sup>585</sup>

“The Code celebrates ‘fun and joy’ and demands ‘fair play’. But it fails to recognize what most of us would perceive as fundamental characteristics of any system of justice and it fails to ‘play fair’ itself. Absent from the Code’s vision, purpose, definition, fundamental rationale and intention is any reference to the fundamental interests and rights of all human beings, including athletes subject to the Code; fairness, due process, presumption of innocence and basic dignity.

Landis rights under the Code were violated because he was not afforded:

- A timely hearing;
- A Fair and impartial hearing body;
- The right of each party to present evidence, including the right to call and question witnesses (subject to the hearing body’s discretion to accept testimony by telephone or written submission);
- A timely, written, reasoned decision.

Landis’ rights were significantly compromised or unduly criticized in the flowing areas:

- The right to be represented by counsel at the Person’s own expense;
- The right to be fairly and timely informed of the asserted anti-doping rule violation;
- The right to respond to the asserted anti-doping rule violation and resulting Consequences.

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<sup>585</sup> William F. Hue is a Wisconsin Circuit Court Judge.

Anti-doping policy, prosecution and adjudication are all just adjuncts of anti-doping enforcement. Such enforcement cannot be entrusted to Courts of Law under the Code because basic individual rights form the foundation of such systems. The Anti-Doping Code cannot leave its political goal to chance. It has thus devised a Star Chamber system to rubber stamp its determination of dopers in sport. In this system, prosecution of an innocent to an adjudication of guilt is as effective as a successful prosecution of an actual doper.

The WADA code must be changed. The noble goal of ridding sport of cheaters has become obsessive. As noble as that goal is, once it becomes so obsessive that it threatens to destroy that which it aspires to protect, as we see happening today in cycling, for example, it has become dangerous. Cycling has reached the point where the fight against doping threatens to destroy not only its structure but its rich history as well. By modifying the system so that it serves its purpose and balances that purpose with respect for basic human rights, all ‘stakeholders’ will benefit. The time to change is now.”<sup>586</sup>

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## International Herald Tribune

October 2, 2007

### [Armstrong blasts decision to ban Landis despite “shoddy” lab work](#)

**Lance Armstrong believes an American jury surely would have ruled in favor of Floyd Landis, unlike the arbitrators who found him guilty of doping.**

By The Associated Press

“ ‘When you are giving someone the death penalty, which they essentially did, you cannot tolerate shoddy work, which they clearly did,’ Armstrong said. ‘I don’t understand that type of rationale. I don’t understand the verdict.’ ”<sup>587</sup>

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<sup>586</sup> <http://trustbut.blogspot.com/2007/10/hues-review-serving-master.html>

<sup>587</sup> <http://www.ihf.com/articles/ap/2007/10/02/sports/NA-SPT-CYC-Armstrong-Landis.php>

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**ESPN**

September 24, 2007

[Rough justice for Floyd Landis](#)

By Jim Caple

“Landis got hosed. The arbitration verdict was unfair and harsh. Despite the questionable evidence, Landis lost his case, his title and possibly his career (not to mention the \$2 million he invested in his defense).

But even so, the drug testing system came out looking worse. The Landis verdict ran the U.S. Anti-Doping Agency’s record to 35-0. Which isn’t surprising given how the appeal system is stacked against athletes.”<sup>588</sup>

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**St. Cloud Times**

September 24, 2007

[Doping tests not fair to athletes](#)

By John D. Reep

“This result was not unexpected, but anybody with a concern for justice should be outraged.

The international system for catching athletic cheaters and assorted scoundrels has the World Anti-Doping Agency as its primary organization. Nations have organizations that fall under the WADA umbrella; our branch of the Kremlin is called the United States Anti-Doping Agency. In more than six years, USADA has never lost an arbitration case.”<sup>589</sup>

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<sup>588</sup> <http://sports.espn.go.com/espn/print?id=3033769&type=story>

<sup>589</sup> <http://www.sctimes.com:80/apps/pbcs.dll/article?AID=/20070924/OPINION/109240040/1006/NEWS01&template=printart>

# Final Words: Improving Fairness

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## *From the Floyd Fairness Fund*

*Drug testing is important.  
Floyd's case illustrates the need for  
improving the testing process to ensure  
fairness and accuracy of drug-testing  
programs.*

*Some of the lessons from this case that can  
be applied to the system to improve the  
process for everyone include:*

**F**ree from conflict of interest<sup>590</sup>  
**A**ccess to information and documents  
**I**nternationally respected standards for testing, use of science, and  
methodologies  
**R**espect for the athletes' rights

Is

**C**ompensation for successful defense and lost income  
**L**eadership responsibility  
**E**xternal oversight of WADA/USADA  
**A**thlete-based timelines for progress of the case  
**R**easonable doubt

## Public Reporting of WADA Committee Minutes, Validation of Tests and Positivity Criteria

Fairness demands openness.

Athletes, coaches, and team management must know what the rules are, and how they are applied.

Although some WADA meeting minutes are available on its website, many important meetings—such as those where positivity criteria are set—do not even keep private minutes.

“What has evolved to protect competitive purity... is a closed, quasi-judicial system without American-style checks and balances.

Anti-doping authorities act as prosecutors, judge, and jury, enforcing rules that they have written, punishing violations based on sometimes questionable scientific tests that they develop and certify themselves, while barring virtually all outside appeals or challenges.”<sup>591</sup>

## Barcoded Tracking

- Including transportation and machine input.

Sample containers are already barcoded. Barcoded transportation reports would help solve chain-of-custody issues during transport.

Barcoded sample-identification-into-machine analysis would help solve key-entry and other issues in assuring accurate sample identification.

## Check Digit

The use of a check digit will allow single digit errors to be recognized as such. A check digit will reduce suggestions of wrong sample specimen use.

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<sup>590</sup> Cipollini, R. E-mail Apr 4, 2007.

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<sup>591</sup> Hiltzik, M. *Presumed Guilty: Athletes' unbeatable foe*. The Los Angeles Times. <http://www.latimes.com/news/nationworld/nation/la-sp-doping10dec10.0.1444445.story?page=1&coll=la-home-headlines>. Accessed Dec 9, 2006.

## **Public Standard Operating Procedures**

The SOPs of all labs should be public information, easily accessible. For example, SOPs should be posted on each lab's website and on WADA's.

## **Mandatory Degradation Reporting for Specific Markers**

Although issues of degradation by bacterial contamination are well known, and standards for excessive degradation exist, such analysis is optional, and no unified system exists to assure that the results of such analysis are reviewed.

A mandatory report form, listing pH, free/conjugated testosterone and epitestosterone ratios, and 5-alpha and 5-beta androstan-3, 17-dione values should be part of every laboratory document package.

## **Mandatory Percent Error Reporting. Rejection of Inaccurate Results**

Landis's document package reveals that 'A' sample confirmation aliquots of testosterone and epitestosterone showed radically different results, with about 200 percent error rates.

The T/E ratio fell into two groups—values around 5 and values around 10.

A mandatory and automated system to report and flag such extreme variations in test results should be implemented.

Analysts must sign off and explain such variations before an AAF is allowed to be issued.

## **Unified Standards Across All Test Methodologies to Set Acceptable False-Positive Rates**

- Better inter-laboratory standardization.

For the carbon-isotope-ratio test, the LNDD will have a false-positive rate of at least 50 times, and perhaps as high as 20,000 times, the rate of UCLA.

Laboratory positivity criteria must be standardized.

## **All Tests Must be Repeated**

Repeated testing characterizes quality analytic work.

For IRMS testing, a relatively large urine volume is required for the androstanediol test, but not for androsterone/etiocholanolone test.

Laboratory quality should not be compromised, and the athlete should not be penalized, because of the limitation of the diol assay.

Until diol assays can be performed with modest urine volumes, they should be used only when sufficient volume exists for replicate analysis to be performed.

## **Cap on Numbers of Tests**

The total volume of tests for targeted athletes, in and out of competition, is currently unlimited.

Some of this is a symptom of in-competition tests being performed on those who are successful.

Landis was tested 31 times in 2006.

Since (i) each test is associated with a false-positive rate (in the case of the LNDD and IRMS testing, apparently at least 7.7% for each test), and since (ii) cumulative career false-positive rates are therefore appreciable, a limit is reasonable.

## **'B' Test at Different Lab**

WADA rules currently mandate that 'B' sample tests be performed in the same lab that performed the 'A' sample.

ISL 5.2.4.3.2.2: "The 'B' Sample confirmation must be performed in the same Laboratory as the 'A' Sample confirmation."

Consider that some WADA leaders have proposed that the 'B' sample test be *eliminated*. One might suppose that this rule is in place to limit the exposure of the WADA system to non-confirmatory analyses.

However, where the 'B' sample does not confirm the 'A' sample, an honest WADA system could use the opportunity to review the underlying reasons for lack of confirmation, and so strengthen their science and the work of the labs.

Further, labs are fallible, and systematic errors do occur. For example, labs may fail to set up an instrument properly—as in the case of the LNDD and the Mickey-Mouse-ears.<sup>592</sup> Testing at another lab may be the only fair way to obtain accurate results.

### **Release Documents to All Parties Simultaneously**

Any documents that laboratories provide to one party should be promptly provided to both.

- It took five weeks for Landis to receive the file documenting his allegedly positive Stage 17 test from USADA.
- It took more than six months, and an arbitrator ruling, to receive the results of his seven other Tour samples from USADA.
- It was less than two weeks before his arbitration that Landis was allowed to review the electronic data files of his Stage 17 sample, files that confirmed the lab's inability to test accurately.
- It was less than one week before his arbitration that Landis was allowed to review the chromatograms that LNDD had labeled positive on other riders in the previous three years—a review that demonstrated a pattern of horrendous chromatography and failed testing.

### **Greater Arbitral Flexibility in Sanction**

As a recent LA Times article shows,<sup>593</sup> many athlete offenses are so minor as to warrant no sanction. However, the arbitrators have little, if any, leeway.

Despite minor latitude to sanction, despite wide variations in intent and doping benefit, almost all offenses carry the same punishment for first and second offenses.

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<sup>592</sup> Iron transport rings were not removed from the LNDD IsoPrime2 machine. All tests ever performed on this machine are suspect. For more information, see page 243.

<sup>593</sup> Hiltzik, M. *Presume Guilty. Athletes see doping case appeals as futile exercise.* The Los Angeles Times. <http://www.latimes.com/news/la-me-doping11dec11.1.905845.story>. Accessed Dec 11, 2006.

### **Unequal Jeopardy**

If an athlete prevails at almost any point in the adjudication, that decision may be appealed by multiple bodies: International and National Sports Federations, National and World ADA, National and International Olympic Committees.

One athlete versus six possible governing bodies/agencies/committees.

In Landis's case, there is also unresolved jurisdiction with a parallel case being prosecuted against him by another organization in France.

For any given laboratory finding, athletes should have to face doping charges only once.

### **Public Reporting of Laboratory Error Rates, Including Revised AAF-Report Rates and Arbitration Decisions**

WADA has made a start by reporting the total number of tests performed and the total number of adverse analytical findings.

Clearly, some laboratories are better than others are.

Just as hospitals in the US report their complication rates, WADA-labs should be open to public scrutiny.

In an effort to improve the analyses of all laboratories, lab error rates and AAF outcome rates for every laboratory should be reported.

### **Blinded Proficiency Testing**

Current proficiency testing is a sham.

WADA labs *are* subject to proficiency testing. However, the lab personnel *know* when the sample is part of a test.

It is like a food critic known to a restaurant receiving the best food and service the restaurant has. It is not a realistic test.

Lab personnel should be running proficiency tests on samples sent to the lab under apparently routine circumstances and not specially handled.

### **Allow Lab Experts to Testify for Either Side**

At present WADA has a monopoly on doping laboratory personnel: they are prohibited from assisting or testifying in the defense of athletes.

Arbitration should be about fairness and truth seeking, not about muzzling scientists.

### **Need for All Arbitrators to Decide Motions**

The exclusion of an arbitrator for deciding a motion, as took place at the Landis AAA hearing, must not happen again.

### **Need for Independent Oversight**

There is no clear accountability or sanction when WADA or one of the laboratories makes a mistake, intentional or not. There should be.

